



Data Acquisition and Conversion Components

DC/DC Converters

Digital Panel Voltmeters and Instruments

Analog Boards for PC/AT and EISA Buses

Analog Boards for VME Bus

Short Form Catalog

June 1994



About DATEL

Founded in 1970, today's DATEL is a multinational electronics manufacturing company that has achieved leadership status in all four of its major product lines ... data acquisition and conversion components, switching DC/DC converters, digital panel voltmeters, and computer analog I/O boards for Multibus, VME, PC/AT and EISA platforms.

Our modern 180,000 square-foot facility in Mansfield, Massachusetts (U.S.A.) is located just 30 minutes from Boston and houses all our design and development, manufacturing and administrative functions. To serve our international customers, we have wholly owned Subsidiary Sales Offices in Japan, Germany, France, and the United Kingdom.

DATEL maintains numerous manufacturing and assembly technologies (including thick and thin-film hybrid, traditional through-hole pc boards, SMT and COB (chip on board) pc boards, and SMT and COB on thick-film ceramic). We have direct access to custom CMOS and bipolar monolithic technologies. As a result of recent large investments in capital equipment, we now possess one of the most modern, fully automated, pick-and-place SMT assembly operations in our industry. We also have made significant investments in complete, in-house, quality/reliability and EMI/EMC testing facilities.

Recent History

Originally founded as a private company, DATEL was a division of the General Electric Company until 1987. Today, we are once again a privately owned company with a small number of managers and key employees holding virtually all Company stock. This form of ownership benefits our customers as it reinforces our commitment to quality, customer service and business success.

Commitment to Quality

DATEL operates under the umbrella of a Company-wide, continuous-improvement program. We exploit SPC, JIT and MRPII manufacturing controls. Our thick and thin-film hybrid facilities are certified to MIL-STD-1772. By the time this catalog is pub-

lished, we may have already achieved the ISO-9001 certification we are currently pursuing. Virtually all our products endure a comprehensive, in-house qualification procedure before being officially introduced for sale.

About This Catalog

This Short Form Catalog includes basic electrical-performance specifications for DATEL's complete product offering. The easy-to-use catalog is divided into five major sections as summarized on the front cover. If you wish to go directly to a particular section, you may use the tabs on the edge of the book as a guide.

Each individual section begins with an introduction and a brief new-product summary. Some sections contain "Feature Products" which are more detailed summaries of the features, benefits and electrical specifications of these higher-performing devices. Each section ends with detailed product selection guides that list the salient features and performance specifications of each product.

Comprehensive product data sheets, with detailed specs and applications information, for each product listed in this catalog are available directly from DATEL or our local representative in your area. Four individual product-line catalogs and a set of DATEL authored application notes are also available free of charge.

Applications Assistance

DATEL employs a large and competent staff of Application Engineers in both our Headquarters and Subsidiary Offices. These experienced Engineers are always available to answer any question you may have concerning the use of our products.

DATEL continues to support many of its older products, though we do not necessarily recommend them for new design-ins. Our newer devices frequently represent much more cost-effective solutions. If you have questions about any DATEL products not listed in this catalog, please contact us directly at our Corporate Headquarters.

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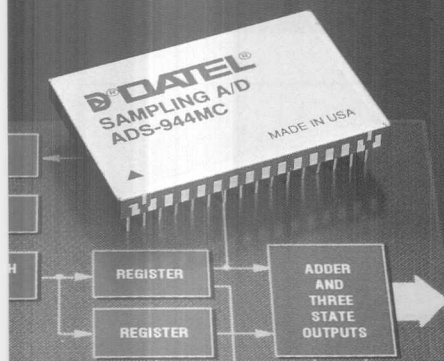
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Contrary to past predictions, the proliferation of low-cost, digital computing power has *increased* rather than decreased the demand for precision, high-speed, analog-signal-processing (ASP) components ... particularly in data acquisition and signal processing applications. Taking advantage of five different manufacturing technologies (monolithic CMOS, monolithic bipolar, thick and thin-film hybrid, and discrete SMT assemblies), DATEL remains committed to fulfilling the growing need for complete, high-speed, ASP solutions.

Our R&D efforts remain focused on high-resolution, sampling analog-to-digital (ADS) converters; high-speed multiplexers; fast-settling sample-hold (S/H)

Data Acquisition and Conversion Components

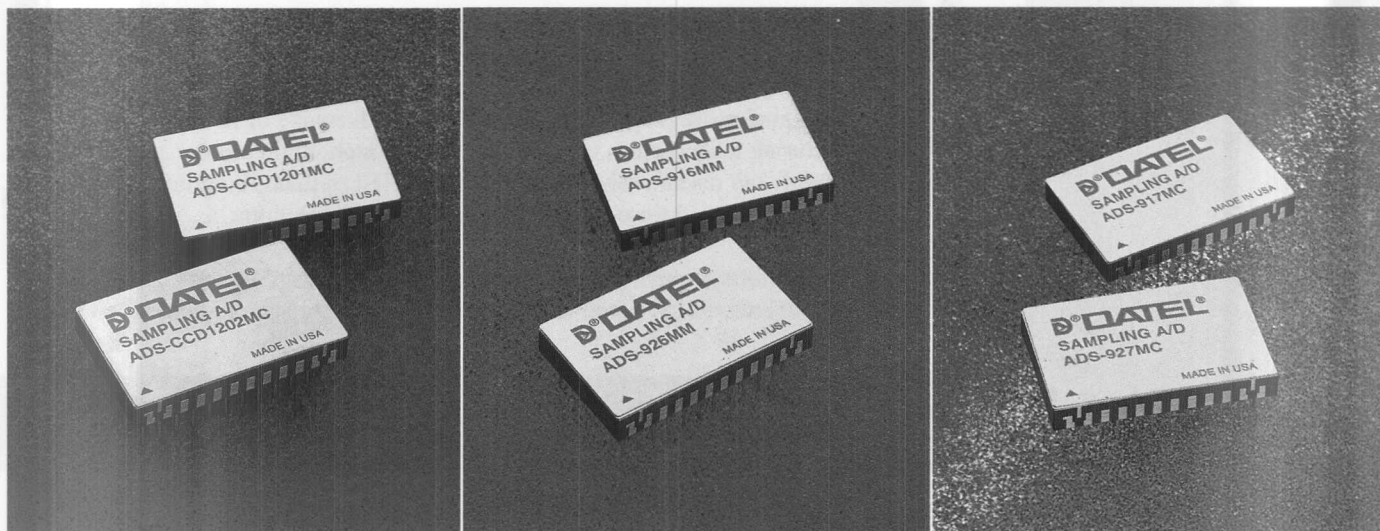


amplifiers; and multi-pole active filters. Our quality-assurance efforts remain dedicated to our Company-wide continuous-improvement program with the goal of supplying you the most reliable products in the industry. Our commitment to customer satisfaction means we readily modify standard products or combine multiple product functions and manufacturing technologies to provide you the most complete "system" solution.

We've worked hard to become a recognized industry leader ... our goal is to improve upon that position.

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New Products



1.2MHz and 2MHz, 12-Bit Sampling A/D Converters for Imaging Applications

Models ADS-CCD1201, ADS-CCD1202

- Performance optimized for electronic imaging with CCD's
- Unipolar input range (0 to +10V)
- 4096-to-1 dynamic range
- Outstanding $\pm 1/4$ LSB DNL
- Low noise: 400 μ V rms (1/6 LSB, CCD1201)
600 μ V rms (1/4 LSB, CCD1202)
- Full scale step response (empty to full well) with ± 1 count maximum error
- Immune to input overvoltages caused by blooming
- Operate from either ± 15 V or ± 12 V supplies
- 1.4/1.6 Watt power consumptions
- Edge triggered, no pipeline delays
- Small, standard, 24-pin DDIP packages
- CDS front-ends under development
- Low cost

See page 1-8.

14-Bit, 500kHz Sampling A/D Converters

Models ADS-916, ADS-926

- Functionally complete
- Small package, 24-pin DDIP
- Low power, 1.3 Watts
- Low cost
- Sampling to Nyquist frequencies
- Outstanding dynamic performance that surpasses many 16-bit A/D's:
 - 92dB peak harmonics ($f_{in} = 100$ kHz)
 - 90dB THD ($f_{in} = 100$ kHz)
 - 80dB SNR ($f_{in} = 100$ kHz)
- No missing codes over temperature
- Unipolar (+10V) or bipolar (± 5 V) analog inputs
- Commercial or military temp. range
- MIL-STD-883 screening optional

See page 1-9.

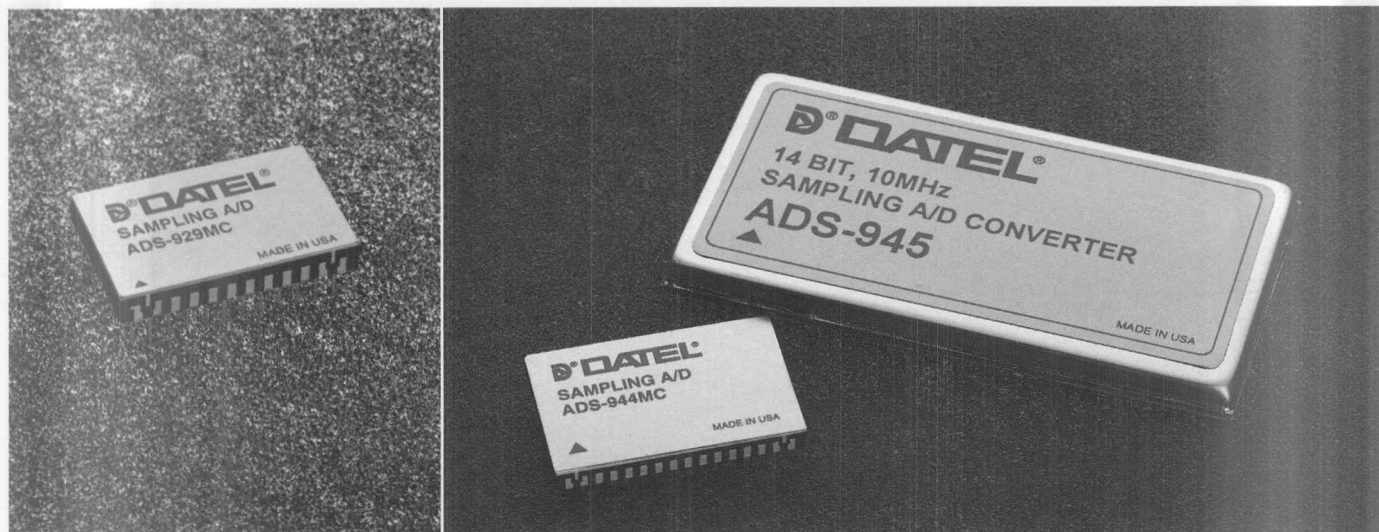
14-Bit, 1MHz Sampling A/D Converters

Models ADS-917, ADS-927

- Functionally complete
- Small package, 24-pin DDIP
- Same pinout as ADS-916/926
- Operates from either ± 15 V or ± 12 V supplies
- Low power, 1.25W with ± 12 V supplies
- Commercial or military temp. range
- No missing codes over temperature
- Solid dynamic performance:
 - 82dB peak harmonics ($f_{in} = 500$ kHz)
 - 80dB THD ($f_{in} = 500$ kHz)
 - 78dB SNR ($f_{in} = 500$ kHz)
- MIL-STD-883 screening optional
- Low cost

See page 1-10.

New Products



14-Bit, 2MHz Sampling A/D Converters

Model ADS-929

- Functionally complete
- Outstanding value - the best combination of performance, package, power and price
- Same 24-pin DDIP package and pinout as ADS-926/927
- Operates from either $\pm 15V$ or $\pm 12V$ supplies
- Low power, 1.7W with $\pm 12V$ supplies
- Edge triggered, no pipeline delays
- Commercial or military temp. range
- No missing codes over temperature
- Impressive dynamic performance:
 - 80dB peak harmonics ($f_{in} = 1MHz$)
 - 78dB THD ($f_{in} = 1MHz$)
 - 77dB SNR ($f_{in} = 1MHz$)
- Low noise
- Low cost

See page 1-10.

14-Bit, 5MHz Sampling A/D Converters

Model ADS-944

- Outstanding value - the best combination of performance, package, power and price
- Functionally complete, TTL compatible
- Small package, 32-pin TDIP
- Low power, 2.9 Watts
- Sampling to Nyquist frequencies
- Excellent dynamic performance:
 - 78dB peak harmonics ($f_{in} = 1MHz$)
 - 77dB THD ($f_{in} = 1MHz$)
 - 76dB SNR ($f_{in} = 1MHz$)
- Low noise, 135 μV rms
- Edge triggered, no pipeline delays
- No missing codes over temperature
- Commercial or military temp. range
- MIL-STD-883 screening optional
- Low cost

See page 1-6.

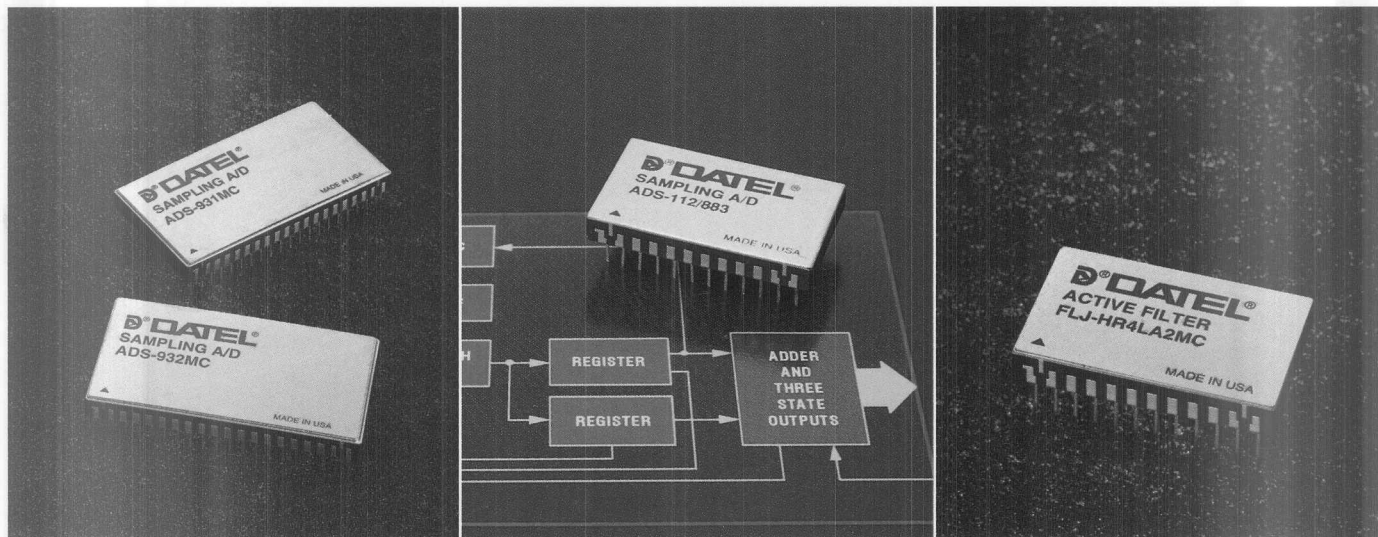
14-Bit, 10MHz Sampling A/D Converters

Model ADS-945

- Functionally complete, no support circuitry
- TTL compatible
- Sampling to Nyquist frequencies
- Superb dynamic performance:
 - 86dB peak harmonics ($f_{in} = 2.5MHz$)
 - 80dB THD ($f_{in} = 2.5MHz$)
 - 78dB SNR ($f_{in} = 2.5MHz$)
- Low noise, ideal for FFT signal processing
- No missing codes over temperature
- 100k Ω input impedance
- Low power, 4.5 Watts
- Unique 2" x 4" DIP package
- Low noise
- Low cost

See page 1-6.

New Products



16-Bit, 1MHz and 2MHz Sampling A/D Converters

Models ADS-931, ADS-932

- Functionally complete, no external support circuitry
- Small packages, 40-pin TDIP's
- TTL compatible
- Low power, 3.7 Watts
- No missing codes over temperature
- Sampling to Nyquist frequencies
- Excellent dynamic performance
- Edge triggered, no pipeline delays
- On-board FIFO
- Unipolar (+10V) and bipolar ($\pm 5V$) input ranges
- Commercial and extended temp. ranges
- Low cost

Available Q4 94, contact DATEL.

MIL-STD-883 Models of 1-5MHz, 12-14 Bit Sampling A/D Converters

Add "/883" to part number

DATEL remains committed to supporting military and other high-reliability applications. We have recently completed MIL-STD-883 qualifications for our 1MHz and 2MHz 12-bit A/D converters (ADS-112/117). We have also qualified our 0.5MHz, 1MHz and 5MHz 14-bit A/D converters (ADS-926/927/944). Additional new A/D's are now in process. Our hybrid facility is certified to MIL-STD-1772, and DATEL is listed on the Qualified Manufacturers List (QML).

See page 1-14.

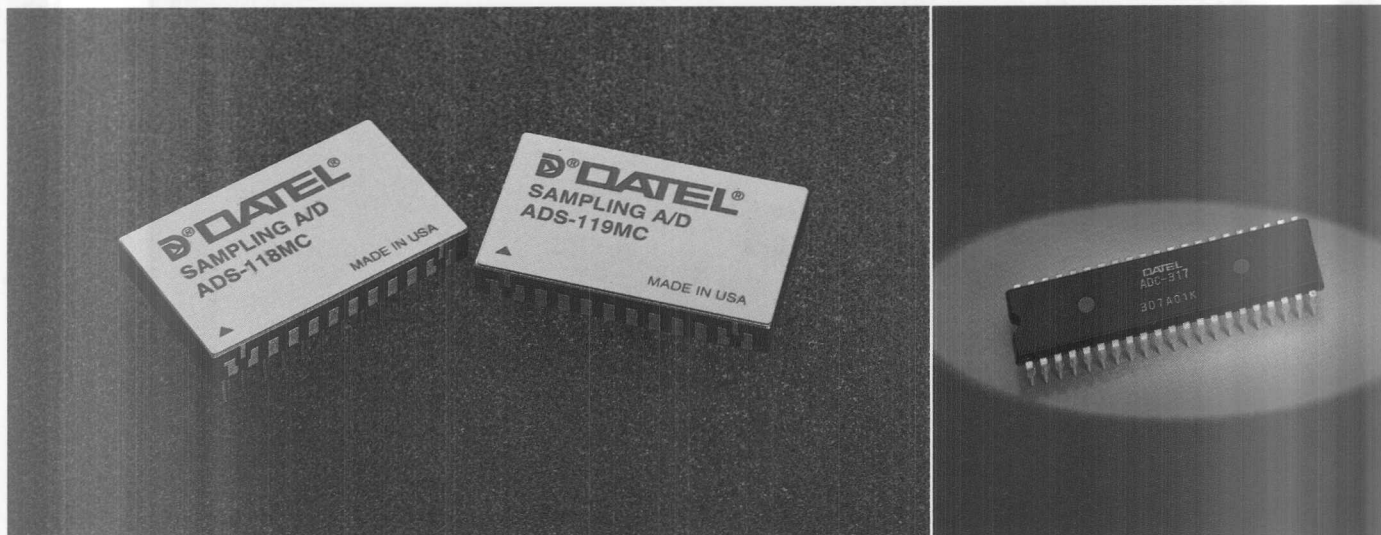
Resistor Tuneable Active Filters

FLJ-HR Series

- f_c (-3dB) variable from 1.6Hz to 100kHz
- f_c selectable with only 4 resistors
- Lowpass, highpass and bandpass functions
- Butterworth and Cauer characteristics
- 70dB minimum attenuation at 1MHz
- Small, 24-pin DIP packages
- Commercial and military temp. ranges
- High-reliability models

See page 1-13.

New Products



12-Bit, 5MHz Sampling A/D Converters

Models ADS-118, ADS-118A

- Functionally complete
- TTL compatible
- Edge triggered, no pipeline delays
- $\pm 5V$ supplies, 1.3 Watts
- Small 24-pin DDIP
- $\pm 1V$ (118) or $\pm 1.25V$ (118A) input range
- Ideal for either time or frequency-domain applications
- No missing codes over temperature
- Sampling to Nyquist frequencies
- Excellent dynamic performance:
 - 75dB peak harmonics ($f_{in} = 1MHz$)
 - 71dB THD ($f_{in} = 1MHz$)
 - 69dB SNR ($f_{in} = 1MHz$)
- Low noise, 195 μV rms
- Commercial and military temp. ranges

See page 1-7.

12-Bit, 10MHz Sampling A/D Converters

Model ADS-119

- Functionally complete
- TTL compatible
- Low noise, 500 μV rms
- Edge triggered, no pipeline delays
- Ideal for either time or frequency-domain applications
- No missing codes over temperature
- Sampling to Nyquist frequencies
- Excellent dynamic performance:
 - 71dB peak harmonics ($f_{in} = 2.5MHz$)
 - 68dB THD ($f_{in} = 2.5MHz$)
 - 69dB SNR ($f_{in} = 2.5MHz$)
- $\pm 5V$ supplies, 1.4 Watts
- Small 24-pin DDIP
- Pin compatible with ADS-118
- Commercial and military temp. ranges
- MIL-STD-883 screening optional

See page 1-7.

8-Bit, 125MHz Plastic Packaged Flash Converters

Model ADC-317

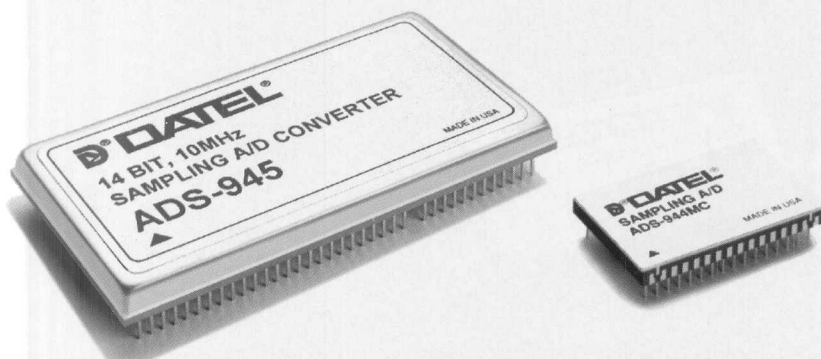
- Low cost
- $\pm 1/2LSB$ INL and DNL
- 46dB signal-to-noise ratio
- 200MHz full scale input bandwidth
- No sparkle code errors
- Low input impedance 190k Ω || 18pF
- ECL compatible
- Single –5.2V supply
- 870mW power consumption
- –20 to +75°C temperature range
- 42-pin plastic DDIP

See page 1-11.

ADS-944/ADS-945

14-Bit, 5MHz/10MHz Sampling Analog-to-Digital Converters

**FEATURE
PRODUCTS**



- 14-bit resolutions
- 5MHz sampling rate (ADS-944)
- 10MHz sampling rate (ADS-945)
- No missing codes over temperature
- Very low noise
- Lowest power in respective product class
- Small packages
- Outstanding dynamic performance
- Edge-triggered, no pipeline delay (ADS-944)
- Superior choices for both time and frequency-domain applications
- Functionally complete
- MIL-STD-883 screening optional (ADS-944)

The ADS-944 and ADS-945 are the newest additions to DATEL's broad, industry-leading family of high-speed, 14-bit sampling A/D converters. These functionally complete devices each contain a fast-settling sample-and-hold amplifier, a subranging (two-pass) A/D converter, an internal reference, timing and control logic, three-state outputs and error-correction circuitry. The ADS-944 is edge-triggered and requires only the rising edge of a start convert pulse to initiate a conversion. Unlike other A/D's in its class, the ADS-944 does not have a pipeline delay and does not require additional clock pulses before output data becomes valid.

The ADS-944 and ADS-945 are low-noise,

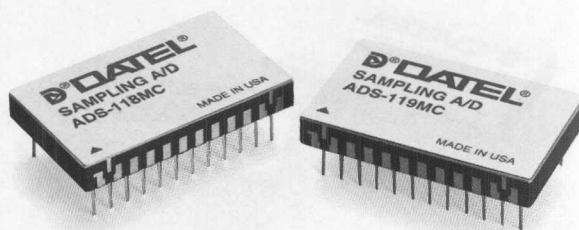
wide-bandwidth A/D converters offering the best combination of performance, size, power dissipation and price. Performance has been optimized for use in a wide range of demanding applications including medical and graphic imaging, radar, process control, FFT spectrum analysis, and telecommunications. Both 5MHz (ADS-944) and 10MHz (ADS-945) devices accurately sample full-scale input signals up to Nyquist frequencies with guaranteed no missing codes to the 14-bit level.

The ADS-944 and ADS-945 are the smallest, lowest priced sampling A/D converters in their product class. Whether it's overall value, performance or price you require, the ADS-944 and ADS-945 are your best choices.

Parameter	ADS-944			ADS-945			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Resolution	—	14	—	—	14	—	Bits
Conversion Rate	5	—	—	10	—	—	MHz
Input Voltage Range	—	±1.25	—	—	±1.25	—	Volts
Logic Compatibility	—	TTL	—	—	TTL	—	
Differential Nonlinearity	-0.95	±0.5	+1.25	-0.95	±0.5	+1.25	LSB
No Missing Codes	14	—	—	14	—	—	Bits
Peak Harmonic	—	-78	-71	—	-86	-82	dB
Total Harmonic Distortion	—	-77	-70	—	-80	-76	dB
Signal-to-Noise Ratio	73	76	—	75	78	—	dB
Signal-to-Noise Ratio + Distortion	70	73	—	70	73	—	dB
Noise	—	135	—	—	110	—	μV rms
Required Supplies	—	±15/+5/-5.2	—	—	±15/+5/-5.2	—	Volts
Power Dissipation	—	2.95	3.3	—	4.5	5.1	Watts
Operating Temperature Range (case):							
ADS-944MC/ADS-945	0	—	+70	0	—	+70	°C
ADS-944MM/ADS-945EX	-55	—	+125	-25	—	+85	°C
Package Type	32-pin TDIP			2" x 4" Custom DIP			

ADS-118/ADS-119

12-Bit, 5MHz/10MHz Sampling Analog-to-Digital Converters



- 12-bit resolutions
- 5MHz sampling rate (ADS-118)
- 10MHz sampling rate (ADS-119)
- No missing codes over full military temperature range
- Very low noise
- $\pm 5V$ supplies, low power
- 24-pin DDIP packages
- Outstanding dynamic performance
- Edge-triggered, no pipeline delays
- Superior choice for both time and frequency-domain applications
- Functionally complete
- MIL-STD-883 screening optional

The ADS-118 and ADS-119 are the newest additions to DATEL's broad family of high-speed, 12-bit sampling A/D converters. These functionally complete devices each contain a fast-settling sample-hold amplifier, a subranging (two-pass) A/D converter, an internal reference, timing and control logic, three-state outputs and error-correction circuitry. Both converters are edge triggered and require only the rising edge of a start convert pulse to initiate a conversion. Unlike other A/D's in their class, they do not have pipeline delays and do not require additional clock pulses before output data becomes valid.

The ADS-118 and ADS-119 are low-noise (typically 0.5LSB rms noise), wide-bandwidth A/D converters offering the best combination of performance, size, power dissipation and price.

Performance has been optimized for use in a wide range of demanding applications including medical and graphic imaging, process control, radar, FFT spectrum analysis, and telecommunications.

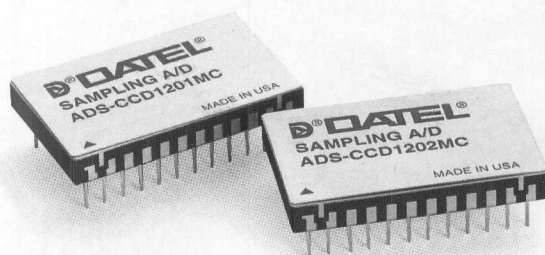
Both 5MHz (ADS-118) and 10MHz (ADS-119) devices accurately sample full-scale input signals up to Nyquist frequencies with guaranteed no missing codes to the 12-bit level over the full military temperature range (-55 to $+125^{\circ}C$). Requiring only $\pm 5V$ supplies, the ADS-118 and ADS-119 dissipate 1.3W and 1.75W, respectively. Both devices are packaged in very small 24-pin DDIP's. Whether it's overall value, performance or price you require, the ADS-118 and ADS-119 are your best choices.

Parameter	ADS-118			ADS-119			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Resolution	—	12	—	—	12	—	Bits
Conversion Rate	5	—	—	10	—	—	MHz
Input Voltage Range	—	± 1	—	—	± 1.5	—	Volts
Logic Compatibility	—	TTL	—	—	TTL	—	
Differential Nonlinearity	—	± 0.5	± 0.75	—	± 0.5	± 0.95	LSB
No Missing Codes	12	—	—	12	—	—	Bits
Peak Harmonic	—	-75	-71	—	-71	-67	dB
Total Harmonic Distortion	—	-71	-67	—	-68	-65	dB
Signal-to-Noise Ratio	66	69	—	66	69	—	dB
Signal-to-Noise Ratio + Distortion	65	68	—	64	67	—	dB
Noise	—	195	—	—	500	—	μV rms
Required Supplies	—	± 5	—	—	± 5	—	Volts
Power Dissipation	—	1.3	1.5	—	1.75	1.9	Watts
Operating Temperature Range (case):							
ADS-118MC/119MC	0	—	+70	0	—	+70	$^{\circ}C$
ADS-118MM/119MM	-55	—	+125	-55	—	+125	$^{\circ}C$
Package Type	24-pin DDIP			24-pin DDIP			

ADS-CCD1201/ADS-CCD1202

1.2MHz and 2MHz Sampling A/D Converters Optimized for Imaging

**FEATURE
PRODUCTS**



- Optimized for electronic imaging with CCD's
- Unipolar input range (0 to +10V)
- 4096-to-1 dynamic range
- Outstanding DNL, $\pm 1/4$ LSB
- Low noise, 1/6LSB
- Full scale step response (empty to full well) with ± 1 count maximum error
- Immune to input overvoltages
- Either ± 15 V or ± 12 V supplies
- Low power
- Edge triggered, no pipeline delays
- Standard 24-pin DDIP packages
- CDS front-ends under development
- Low cost

The functionally complete and easy-to-use ADS-CCD1201/2 are 12-bit, 1.2MHz and 2MHz sampling A/D converters whose performance and production testing have been optimized for use in electronic imaging applications, particularly those employing CCD's (charge coupled devices) as their photodetector. In particular, these two A/D's offer the lowest noise and the best differential linearity errors of any high-speed 12-bit A/D's. See DATEL ap note AN-6 "Seeing is Believing" for an explanation of why these two specifications are so important. In CCD applications, the ADS-CCD1201/2 not only deliver outstanding electrical performance, they can respond to full-scale input signal steps (from an empty to a full well) with no more than a single count of error, and they are effectively

immune to overvoltages that may occur due to blooming.

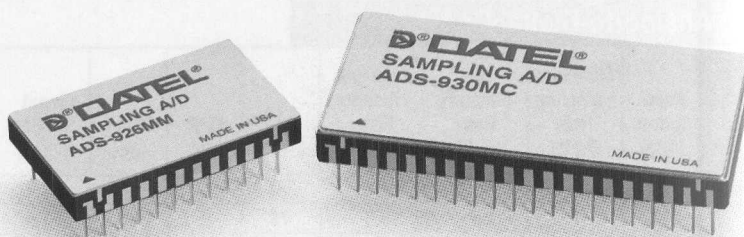
The ADS-CCD1201/2 have unipolar 0 to +10V input ranges which can eliminate the need for signal offsetting. They are packaged in standard 24-pin DDIP's and require no external support circuitry. Both devices operate from either ± 15 V or ± 12 V supplies eliminating the need for DC/DC converters in many applications. They consume comparatively low power and are attractively priced considering that comparable performance is unavailable.

DATEL currently has in development a number of different correlated double sampling functions, and we welcome the opportunity to modify any of them to suit your particular OEM application. Please contact us directly.

Parameter	ADS-CCD1201			ADS-CCD1202			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Resolution	—	12	—	—	12	—	Bits
Conversion Rate	1.2	—	—	2	—	—	MHz
Input Voltage Range	—	0 to +10	—	—	0 to +10	—	Volts
Logic Compatibility	—	TTL	—	—	TTL	—	
Differential Nonlinearity	—	± 0.25	± 0.35	—	± 0.25	± 0.4	LSB
No Missing Codes	12	—	—	12	—	—	Bits
Peak Harmonic	—	-86	-80	—	-80	-76	dB
Total Harmonic Distortion	—	-84	-79	—	-78	-74	dB
Signal-to-Noise Ratio	72	73	—	70	71	—	dB
Signal-to-Noise Ratio + Distortion	71	73	—	68	69	—	dB
Noise	—	400	—	—	600	—	μ V rms
Required Supplies	—	$\pm 15/12$, +5	—	—	$\pm 15/12$, +5	—	Volts
Power Dissipation (± 15 V/ ± 12 V)	—	1.7/1.4	1.9/1.6	—	1.9/1.6	—	Watts
Operating Temperature Range (case):							
ADS-CCD1201MC/1202MC	0	—	+70	0	—	+70	$^{\circ}$ C
ADS-CCD1201MM/1202MM	-55	—	+125	-55	—	+125	$^{\circ}$ C
Package Type	24-pin DDIP			24-pin DDIP			

ADS-926/ADS-930

14-Bit/16-Bit, 500kHz Sampling Analog-to-Digital Converters



- Low Cost
- Functionally complete
- Small packages
- No missing codes
- Sampling to Nyquist frequencies
- Excellent dynamic performance
- Low power dissipations
- Commercial or military temp. ranges
- MIL-STD-883 screening optional (ADS-926)

Unlike other 500kHz, 16-bit sampling A/D's, DATEL's ADS-930 is a fully functional, easy-to-use, single-package device requiring no external circuitry (such as a clock, logic gates or output latches). All you need is power supplies, bypass capacitors and a start-convert pulse.

The ADS-930 is priced well below all its competitors. Packaged in a 40-pin TDIP, it occupies 30% less board space than its closest competitor. The device is fully tested and specified over either the 0 to +70°C commercial or the -55 to +125°C military temperature range. In terms of functionality, the TTL compatible ADS-930 has user-selectable unipolar (0 to +10V) or bipolar ($\pm 5V$) input ranges, an on-board reference that's available to the user, an overflow pin, 6 different user-selectable output coding options, a 3-state output register, and an on-board 16-word FIFO memory.

The ADS-926 is the ADS-930's 14-bit counterpart. This low-noise (300 μV rms), functionally complete device is packaged in a small 24-pin DDIP and dissipates just 1.3W.

Its industry-leading performance features no missing codes guaranteed over the full military temperature range and a total harmonic distortion of -90dB. The 14-bit ADS-926 actually has better distortion characteristics than any existing 16-bit sampling A/D converter.

The TTL compatible ADS-926 has either a bipolar ($\pm 5V$) or a unipolar (0 to +10V, model ADS-916) input voltage range and is fully tested and specified over either the 0 to +70°C commercial or the -55 to +125°C military temperature range. It is the only choice for either time (imaging, process control) or frequency-domain (radar, telecommunications) applications.

Make the choice many others have already made ... use an ADS-926 or ADS-930 in your next design.

Parameter	ADS-926			ADS-930			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Resolution	—	14	—	—	16	—	Bits
Conversion Rate	500	—	—	500	—	—	kHz
Input Voltage Range	—	0 to +10, ± 5	—	—	0 to -10, ± 5	—	Volts
Logic Compatibility	—	TTL	—	—	TTL	—	
Differential Nonlinearity	—	± 0.5	± 0.95	—	± 0.75	—	LSB
No Missing Codes	14	—	—	16	—	—	Bits
Peak Harmonic	—	-92	-88	—	-91	—	dB
Total Harmonic Distortion	—	-90	-86	—	-89	-81	dB
Signal-to-Noise Ratio	78	80	—	81	83	—	dB
Signal-to-Noise Ratio + Distortion	77	79	—	78	81	—	dB
Noise	—	300	—	—	150	—	μV rms
Required Supplies	—	± 15 , +5	—	—	± 15 , +5	—	Volts
Power Dissipation	—	1.3	1.75	—	3.5	4.25	Watts
Operating Temperature Range (case):							
ADS-926MC/930MC	0	—	+70	0	—	+70	°C
ADS-926MM/930MM	-55	—	+125	-55	—	+125	°C
Package Type	24-pin DDIP			40-pin TDIP			

Sampling Analog-to-Digital (ADS) Converters are the flagship of DATEL's data acquisition components product line. Our newest high-resolution (12, 14 and 16 bits), high-speed (0.5 to 10MHz), low-noise ADS converters represent outstanding value. All are both statically and

dynamically (FFT) tested and guarantee performance over their full operating temperature ranges. Each product's combination of superior performance, low power, small package and low price is unmatched. Design one in and your system will have similar attributes.

Sampling Analog-to-Digital Converters

Model	Resolution (Bits)	Minimum Sampling Rate (MHz)	Diff. Linearity Error (\pm LSB)	Integral Linearity Error (\pm LSB)	THD ($-$ dB)	SNR (dB)	SINAD (dB)	Input Ranges (Volts)	Power Supplies (Volts)	Power (Watts)	Package ①	Comments
ADS-111	12	0.5	0.5	0.5	70	—	—	+10, \pm 5	+5, \pm 15	1.4	24-Pin DDIP H	Three-state output
ADS-112 ②	12	1	0.5	0.5	78	72	70	+10, \pm 5	+5, \pm 15	1.3	24-Pin DDIP H	Superior performance
ADS-CCD1201	12	1.2	0.25	0.5	84	73	73	+10	+5, \pm 15/12	1.7/1.4	24-Pin DDIP H	Optimized for imaging
ADS-CCD1202	12	2	0.25	0.5	78	71	69	+10	+5, \pm 15/12	1.7/1.4	24-Pin DDIP H	Optimized for imaging
ADS-117 ②	12	2	0.5	0.5	78	72	70	+10, \pm 5	+5, \pm 15	1.6	24-Pin DDIP H	ADS-112 upgrade
ADS-132 ②	12	2	0.5	0.75	80	72	70	③	+5, \pm 15	2.9	32-Pin TDIP H	Versatile performer
ADS-118	12	5	0.5	0.75	72	69	68	\pm 1.0	\pm 5	1.3	24-Pin DDIP H	Very low noise
ADS-118A	12	5	0.5	0.75	72	69	68	\pm 1.25	\pm 5	1.3	24-Pin DDIP H	Offset adjustment
ADS-119 ②	12	10	0.5	0.75	69	69	67	\pm 1.5	\pm 5	1.75	24-Pin DDIP H	Great performance
ADS-924	14	0.3	0.5	0.5	76	—	—	+10, \pm 5	\pm 5, \pm 15	1.4	24-Pin DDIP H	Three-state buffers
ADS-916/926 ②	14	0.5	0.5	0.5	90	80	79	+10, \pm 5	+5, \pm 15	1.3	24-Pin DDIP H	Great performance
ADS-928	14	0.5	0.5	0.5	90	80	80	$-$ 10, \pm 5	+5, \pm 15	2.5	32-Pin TDIP H	Functionally versatile
ADS-917/927 ②	14	1	0.5	0.5	90	79	78	+10, \pm 5	+5, \pm 15/12	1.4/1.25	24-Pin DDIP H	ADS-926 upgrade
ADS-941	14	1	0.25	0.5	87	82	79	+10, \pm 5	+5, \pm 15	2.8	32-Pin TDIP H	Proven performance
ADS-929	14	2	0.5	0.75	86	78	77	\pm 5	+5, \pm 15/12	1.9/1.7	24-Pin DDIP H	ADS-942 upgrade
ADS-942	14	2	0.5	0.5	83	82	80	+10, \pm 5	+5, \pm 15	2.9	32-Pin TDIP H	Functionally complete
ADS-942A	14	2	0.5	0.5	83	82	80	+10, \pm 5	\pm 5, \pm 15	2.2	32-Pin TDIP H	Low power version
ADS-944 ②	14	5	0.5	0.75	82	76	75	\pm 1.25	+5, $-$ 5.2, \pm 15	2.9	32-Pin TDIP H	Lowest power Smallest package Best performance
ADS-945	14	10	0.5	0.75	84	81	76	\pm 1.25	+5, $-$ 5.2, \pm 15	4.5	Custom DIP	Ultra-low power
ADS-930	16	0.5	0.5	0.75	89	83	81	$-$ 10, \pm 5	+5, \pm 15	3.5	40-Pin TDIP H	On-board FIFO
ADS-931 ④	16	1	0.5	0.75	85	83	80	$-$ 10, \pm 5	+5, \pm 15	3.5	40-Pin TDIP H	Low power and
ADS-932 ④	16	2	0.5	0.75	83	82	79	$-$ 10, \pm 5	+5, \pm 15	3.5	40-Pin TDIP H	High performance

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① M: Monolithic, H: Hybrid

② MIL-STD-883 models available.

③ $-$ 5, $-$ 10, +10, \pm 5, \pm 10 Volts

④ Available Q4 94

Dynamic Testing of ADS Converters

All of DATEL's high-speed, high-resolution (12, 14 and 16 bits) sampling A/D converters are 100% production tested for both static and dynamic performance parameters. Dynamic testing consists of a series of Fast Fourier Transforms (FFT's) performed on state-of-the-art, DATEL-designed, production test equipment. Analog input signals are digitally synthesized and passively bandpass filtered to ensure spectral purity (harmonics well below -90dB). Conversion clocks are crystal generated and exhibit minimum jitter. A/D's under test are run at their fully specified sampling/conversion rates (f_s). Full scale input signals (-0.5dB) are typically applied at a frequency (f_{in}) slightly less than $1/2f_s$.

Computers perform 8,192-point FFT's for 12-bit devices, 16,384-point FFT's for 14-bit devices or 65,536-point FFT's for 16-bit devices. Input signals and conversion clocks are synchronized so an integral number of signal cycles occur during the sampling interval (coherent sampling), and no windowing functions are applied to the digital data.

Differential nonlinearity is tested using the histogram technique, and noise is characterized using a mathematical analysis of "grounded-input" histograms.

Analog-to-Digital Converters

Model	Resolution (Bits)	Guaranteed Conversion Time/Rate	Differential Linearity Error (\pm LSB)	Integral Linearity Error (\pm LSB)	Input Ranges (Volts)	Power Supplies (Volts)	Power (Watts)	Package ①	Comments
ADC-207 ②	7	20MHz	0.3	0.8	+5	+5	0.25	18-Pin DIP M 24-Pin LCC M	CMOS flash
ADC-208 ②	8	15MHz	0.5	0.5	+5	+5	0.66	24-Pin DIP M 24-Pin LCC M	
ADC-228 ②	8	20MHz	0.75	0.5	+5	+5, \pm 15	1.5	24-Pin DDIP H	Fully functional
ADC-304	8	20MHz	0.5	0.5	-2	+5 or \pm 5	0.39	28-Pin DDIP M	ECL flash, TTL I/O
ADC-317	8	125MHz	0.5	0.5	-2	-5.2	0.87	42-Pin DDIP M	ECL flash, low cost
ADC-500	12	0.5 μ s	0.5	0.5	+10/20, \pm 10	\pm 5, \pm 15	1.6	32-Pin TDIP H	No missing codes
ADC-505	12	0.55 μ s	0.5	0.5	+10/20, \pm 10	\pm 5, \pm 15	1.6	32-Pin TDIP H	No missing codes
ADC-530	12	0.35 μ s	0.5	0.5	+10/20, \pm 10	+5, \pm 15	2.1	32-Pin TDIP H	500/505 upgrade
ADC-HX ②	12	20 μ s	0.75	0.5	+5/10, \pm 2.5/5/10	+5, \pm 15	1.1	32-Pin TDIP H	Fully functional
ADC-HZ ②	12	8 μ s	0.75	0.5	+5/10, \pm 2.5/5/10	+5, \pm 15	1.1	32-Pin TDIP H	Pin compatible to HX

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① M: Monolithic, H: Hybrid

② MIL-STD-883 models available.

Digital-to-Analog Converters

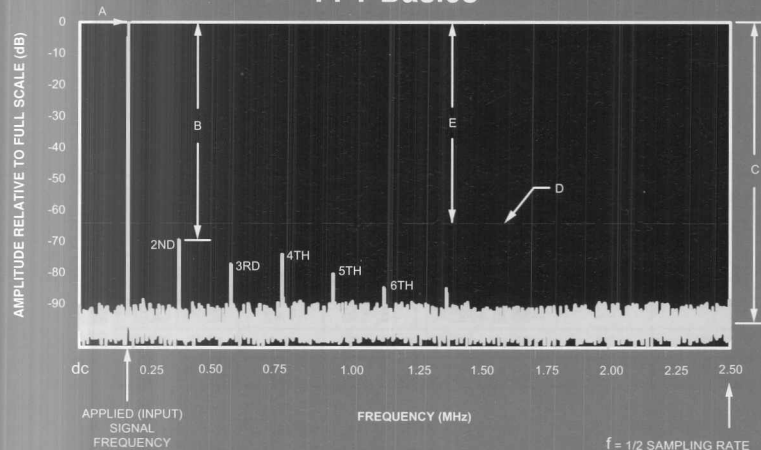
Model ①	Resolution (Bits)	Settling Time (μ s)	Output	Integral Linearity Error (\pm LSB)	Differential Linearity Error (\pm LSB)	Coding	Power Supplies (Volts)	Power (Watts)	Package ②	Comments
DAC-HF8B	8	0.025	+5, \pm 2.5mA	0.5	0.5	Bin	\pm 15	0.7	24-Pin DDIP H	Precision and speed
DAC-HF10B	10	0.025	+5, \pm 2.5mA	0.5	0.5	Bin	\pm 15	0.8	24-Pin DDIP H	
DAC-HF12B	12	0.05	+5, \pm 2.5mA	0.5	0.5	Bin	\pm 15	0.85	24-Pin DDIP H	
DAC-HK12B	12	3	+10, \pm 2.5/5/10V	0.5	0.75	Bin, 2C	+5, \pm 15	0.7	24-Pin DDIP H	Buffered input, stable
DAC-HZ12B	12	3	+5/10, \pm 2.5/5/10V	0.5	0.75	CBin	\pm 15	0.39	24-Pin DDIP H	High performance, stable
DAC-HZ12D	3-Digit	3	+2.5/ 5/10V	0.25	0.25	CBin	\pm 15	0.39	24-Pin DDIP H	3-digit BCD
DAC-HP16B	16	15	+10, \pm 5/10V	2	2	CBin	\pm 15	0.675	24-Pin DDIP H	Ultra-stable precision

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① MIL-STD-883 models available for all listed products except DAC-HZ12D.

② M: Monolithic, H: Hybrid

FFT Basics



- A = Input Signal Amplitude
- B = Peak Harmonic (Spurious Free Dynamic Range)
- C = Average Noise Level (Noise Floor)
- D = RMS Noise Level
- E = Signal-to-Noise Ratio (RMS-to-RMS)

8192-Point FFT; Horizontal Axis has 4096 frequency bins

$$\text{Bin Width} = \frac{\text{Sampling Rate}}{\text{Number of Points in FFT}} = \frac{f_s}{N}$$

Multiplexers

Model	Channels	Settling Time to $\pm 0.01\%$ (μ s)	Access Time (ns)	Input Range (\pm Volts)	On Resistance (Ohms)	Input Leakage		Power Supplies (Volts)	Power (mW)	Package ①	Comments
						Off Channel (pA)	On Channel (pA)				
MX-850	4SE	0.05 ②	20	10	18 to 70	20	400	+5, ± 15	207	14-Pin DIP H	Ultra-fast
MX-826 ④	8SE	0.225 ③	70	10	2500	—	—	+5, ± 15	395	24-Pin DDIP H	14-bit accuracy
MX-1616C	16SE/8D	0.8	150	15	750	10	40	± 15	900	28-Pin DDIP M	Dielectrically isolated CMOS
MV-1606	16SE	2.4	300	15	270	30	1000	± 15	105	28-Pin DDIP M	Low on resistance DI CMOS
MVD-807	8D	2.4	300	15	270	30	1000	± 15	105	28-Pin DDIP M	
MV-808	8SE	2.8	350	15	250	20	100	± 15	55	16-Pin DIP M	
MVD-409	4D	2.8	350	15	250	20	50	± 15	55	16-Pin DIP M	
MX-818C	8SE/4D	3	400	15	750	50	100	± 15	540	18-Pin DIP M	Dielectrically isolated CMOS
MX-1606	16SE	3	500	15	1500	30	100	± 15	105	28-Pin DDIP M	Overvoltage protection DI CMOS
MX-808	8SE	3	500	15	1500	30	100	± 15	105	16-Pin DIP M	
MXD-409	4D	3	500	15	1500	30	100	± 15	105	16-Pin DIP M	
MXD-807	8D	3	500	15	1500	30	100	± 15	105	28-Pin DDIP M	

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① M: Monolithic, H: Hybrid

② 100nsec to $\pm 0.001\%$

③ 400nsec to $\pm 0.003\%$

④ MIL-STD-883 models available

Sample-and-Hold Amplifiers

Model	Accuracy (%)	Acquisition Time (μ s)	Aperture Delay (ns)	Input Range (\pm Volts)	Gain	Small Signal Bandwidth (MHz)	Hold Mode Droop ($\mu\text{V}/\mu\text{s}$)	Power Supplies (Volts)	Power (Watts)	Package ①	Comments
SHM-7	0.1	0.04	3	5	+0.995	40	100	± 15	1.8	24-Pin DDIP H	Dual output
SHM-40	0.1	0.04	3	2.5	+0.993	40	100	± 15	1.8	24-Pin DDIP H	Video speed
SHM-HU	0.1	0.025	6	2.5	+0.995	50	50	$\pm 5, \pm 15$	2.5	24-Pin DDIP H	Ultra high speed video
SHM-6	0.02	2	20	10	± 1 to 10	5	10	+5, ± 15	1.875	32-Pin TDIP H	Gain programmable
SHM-LM-2	0.01	6	100	10	+1	1	0.2	± 5 to ± 18	0.18	TO-99 M	Low cost
SHM-IC-1	0.01	5	30	10	+1	2.5	0.05	± 15	0.135	14-Pin DIP M	
SHM-20C	0.01	1	30	10	+1	2	0.08	± 15	0.33	14-Pin DIP M	Differential inputs
SHM-30C	0.01	0.5	25	10	+1	4.5	0.01	± 15	0.735	14-Pin DIP M	
SHM-49	0.01	0.16	6	10	-1	16	0.5	+5, ± 15	0.365	8-Pin DIP H	Ultra small, low cost
SHM-45	0.01	0.16	6	10	-1	16	0.5	+5, ± 15	0.73	24-Pin DDIP H	Optimized for ADC-500/505
SHM-4860	0.01	0.16	6	10	-1	16	0.5	+5, ± 15	0.73	24-Pin DDIP H	MIL-STD-883 optional
SHM-43	0.01	0.025	5	2	+1	150	1	$\pm 5, \pm 15$	0.545	14-Pin DIP H	Small, low power
MSH-840	0.01	0.775	15	10	+1	13	1.5	+5, ± 15	2.25	32-Pin TDIP H	Quad SSH with MUX
SHM-91	0.002	2	15	10	+1	1	5	± 15	0.7	24-Pin DDIP H	Dual with MUX I/O
SHM-945	0.0004	400	5	10	-1	16	0.5	+5, ± 15	0.305	24-Pin DDIP H	Precision

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① M: Monolithic, H: Hybrid

Single-Package Data Acquisition Systems

Model ①	Resolution (Bits)	Input Channels	Throughput Rate (kHz, Min.)	Integral Linearity Error (\pm LSB)	Differential Linearity Error (\pm LSB)	Total Harmonic Distortion (-dB)	No Missing Codes	Power Supplies (Volts)	Power (Watts)	Package	Comments
HDAS-16/8	12	16SE/8D	50	1	1	—	-55 to +125°C	+5, ± 15	1.45	62-Pin QDIP	Mux., instru. amp, S/H, A/D, 3-state, timing and control
HDAS-75/76	12	8SE/4D	75	0.75	0.75	73	-55 to +125°C	+5, ± 15	0.5	40-Pin DDIP	
HDAS-528/524	12	8SE/4D	400	0.75	0.75	73	-55 to +125°C	+5, ± 15	2.6	40-Pin DDIP	

All specification limits are typical at $T_A = +25^\circ\text{C}$ unless noted.

① MIL-STD-883 models available for all listed products except HDAS-524.

Operational Amplifiers

Model	Open Loop Gain (000)	Gain Bandwidth Product (MHz)	Slew Rate (V/ μ s)	Input Offset Voltage (\pm mV)	Offset Voltage Drift (μ V/ $^{\circ}$ C)	Input Bias Current (nA)	Output (\pm V @ \pm mA)	Power (\pm V @ \pm mA)	Package ①	Comments
AM-420	100	6.5	35	1	3	0.002	12.9/20	15/3	8-Pin DIP M	Low bias current
AM-430	1000	2.5	0.5	0.025	0.6	2	10/15	15/1.3	TO-99 M	Low drift
AM-427	1000	5	1.7	0.025	0.6	40	11/18	15/4.7	8-Pin DIP/TO-99 M	Low noise
AM-464-2	100	4	5	6	15	30	35/10	10 to 40 / 4.5	TO-99 M	High voltage swing
AM-450-2	25	12	30	4	20	125	10/10	15/10	TO-99 M	Wide bandwidth
AM-452-2	15	20	120	5	30	125	10/10	15/10	TO-99 M	
AM-460-2	150	12	7	3	10	5	10/10	15/5	TO-99 M	
AM-462-2	150	100	35	3	15	5	10/10	15/5	TO-99 M	
AM-6330	1	250	2500	5	33	15	13/100	12/21	8-Pin DIP M	Buffer
AM-500	1000	130	1000	3	5	4	10/50	15/22	14-Pin DIP H	High speed
AM-1435	100	1000	300	2	5	10 μ A	7/14	15/30	14-Pin DIP H	Fast settling

All specification limits are typical at $T_A = +25^{\circ}$ C unless noted.

① M: Monolithic, H: Hybrid

Filters

Model	Poles	Filter Type ①	Low Pass	High Pass	Band Pass	Band Reject	Rolloff (dB/Octave)	Frequency Cutoff Range (fc)	Gain	Package	Comments
FLT-U2	2	BU, CH, BE, CA	X	X	X		12	0.001Hz-200kHz	0.1 - 1	16-Pin DIP	Universal active filter
FLJ-D Series	2	BU, CH, BE	X	X	X	X	12	1Hz-159kHz	1 - 10	40-Pin QDIP	Digitally programmable
FLJ-UR Series	2, 4	BU, CH	X	X	X	X	12, 24, 42	40Hz-20kHz	1	20-Pin SIP	Small, resistor tuneable
FLJ-V Series	4	BU	X	X	X		12, 24	20Hz-100kHz	1	40-Pin QDIP	Voltage tuneable
FLJ-HR Series	2, 4	BU, CH, BE, CA	X	X	X		12, 24, 42	10Hz-100kHz	1	24-Pin DDIP	Hybrid, extended and mil. temperature ranges
FLJ-D5/D6	5, 6	CH	X				60, 80	10Hz-20kHz	1	40-Pin QDIP	High order, resistor-tuneable
FLJ-R Series	6, 8	CA	X		X		100, 135	10Hz-20kHz	1	40-Pin QDIP	

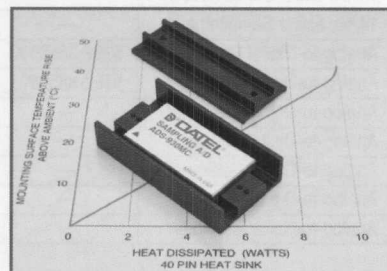
① BU = Butterworth BE = Bessel CA = Cauer/Elliptical CH = Chebyshev

Oscillators

Model	Frequency Range (kHz)	Frequency Accuracy (\pm %)	Frequency Drift (\pm ppm/ $^{\circ}$ C)	Output (\pm V @ \pm mA)	Distortion (% Max)	Power Supplies (\pm Volts)	Power (Watts)	Package	Comments
ROJ-20	0.02 to 2	0.5 (1kHz)	15	10/5	0.005	15	0.525	24-Pin DDIP	Small, resistor-tuneable hybrid
ROJ-1K	1 to 100	0.5 (10kHz)	25	10/5	0.01	15	0.525	24-Pin DDIP	

Heat Sinks

All of DATEL's hybrid data acquisition/conversion components achieve their room-temperature ($T_A = +25^{\circ}$ C) electrical performance and are room-temperature production tested without the use of heat sinks. For applications in which some of our higher-power devices will be exposed to elevated temperatures for extended periods, long-term reliability may be improved by using one of our custom designed heat sinks. They typically reduce case-to-ambient thermal impedances by 40-50% and junction temperatures by 30-40%. Request DATEL Application Note AN-8 "Heat Sinks for DIP Data Converters" for additional information.



Military and High-Reliability Screening

As other companies rapidly exit the military components business, DATEL remains steadfastly committed to supporting our military/aerospace customers. Our commitment is evidenced by the fact we recently completed MIL-STD-883 qualifications for a number of our popular, high-performance sampling A/D converters, and our newest devices are now in the qualification process.

DATEL remains on the QML (Qualified Manufacturers List) as we maintain our hybrid facility's MIL-STD-1772 certification. We routinely design, develop, assemble and screen thick and thin-film hybrids in full compliance with the demanding requirements of MIL-H-38534 and MIL-STD-883.

DATEL recognizes that governments and military contractors are exploring ways to reduce the expense of many military programs. In response to that need, we offer a cost-effective alternative to full "883" processing. DATEL's "QL" program removes

some of the more expensive aspects of "883" while maintaining its most important elements (such as burn-in, temperature cycling and hermeticity testing).

As you'd expect from DATEL, our Quality Assurance people are more than happy to meet with you to help customize a screening program that achieves both your cost and reliability objectives.

The table below summarizes MIL-STD-883 screening. It also lists the types of screens performed in DATEL's "QL" program. Some test conditions are slightly different for "QL" screening.

The table at the bottom of the page lists a number of DATEL data acquisition components that are currently available with MIL-STD-883 screening. Many additional products are available with "QL" screening. Contact us directly if you have any questions.

883 Operation/Test	Method	Conditions	QL
Incoming Inspection	MIL-H-38534		Yes
Element Evaluation	MIL-H-38534		No
Wire Bond Pull	2011	Destructive/nondestructive, in process (sample)	Yes
Internal Visual (precap)	2017	100%	Yes
Stabilization Bake	1008	Test Condition C, 24hrs. @ 150°C, 100%	Yes
Temperature Cycling	1010	Test Condition C, -65 to +150°C, 100%	Yes
Constant Acceleration	2001	Test Condition A, Y axis, 5kg, 100%	Yes
PIND	2020	Test Condition B	As required
Pre-Burn-in Electrical	--	100%	Yes
Burn-in	1015	Test Condition B, 160hrs. @ +125°C, 100%	Yes
PDA	--	10%	Yes
Final Electrical	Static & Dynamic	Performed @ -55, +25, and +125°C, 100%	Yes
Seal (fine and gross leak)	1014	Test Condition A (fine), 100%	Yes
		Test Condition C (gross), 100%	Yes
External Visual	2009	100%	Yes
Group A	MIL-H-38534		As required
Group B	MIL-H-38534		As required
Group C	MIL-H-38534		As required
Group D	MIL-H-38534		As required

MIL-STD-883 Products	Date Available	Description	DESC Drawing
ADS-111/883	Now	12-bit, 500kHz Sampling A/D	—
ADS-112/883	Now	12-bit, 1MHz Sampling A/D	—
ADS-117/883	Now	12-bit, 2MHz Sampling A/D	—
ADS-119/883	Dec. 94	12-bit, 10MHz Sampling A/D	—
ADS-132/883	Now	12-bit, 2MHz Sampling A/D	—
ADS-926/883	Now	14-bit, 500kHz Sampling A/D	—
ADS-927/883	Now	14-bit, 1MHz Sampling A/D	—
ADS-944/883	Sep. 94	14-bit, 5MHz Sampling A/D	—
ADC-HZ12B/883	Now	Analog-to-Digital Converter	5962-8850802
ADC-HX12B/883	Now	Analog-to-Digital Converter	5962-8850801
ADC-816/883	Now	Analog-to-Digital Converter	—
ADC-511/883	Now	Analog-to-Digital Converter	—
ADC-228/883	Now	Analog-to-Digital Converter	—
ADC-208/883	Now	Analog-to-Digital Converter	—
ADC-207/883	Now	Analog-to-Digital Converter	—

MIL-STD-883 Products	Date Available	Description	DESC Drawing
DAC-HZ12B/883	Now	Digital-to-Analog Converter	—
DAC-HP16B/883	Now	Digital-to-Analog Converter	5962-8953101
DAC-HK12B/883	Now	Digital-to-Analog Converter	5962-8952801
DAC-HF12/883	Now	Digital-to-Analog Converter	—
DAC-HF10/883	Now	Digital-to-Analog Converter	—
DAC-HF8/883	Now	Digital-to-Analog Converter	—
HDAS-76/883	Now	Data Acquisition System	—
HDAS-75/883	Now	Data Acquisition System	—
HDAS-16/883	Now	Data Acquisition System	5962-8851404
HDAS-8/883	Now	Data Acquisition System	5962-8851403
HDAS-528/883	Now	Data Acquisition System	—
MX-826/883	Now	Multiplexer	5962-9450601
SHM-4860/883	Now	Sample/Hold Amplifier	—



9-36 Volts 18-72 Volts DC/DC Converters

Unipolar, Bipolar and Triple Outputs!

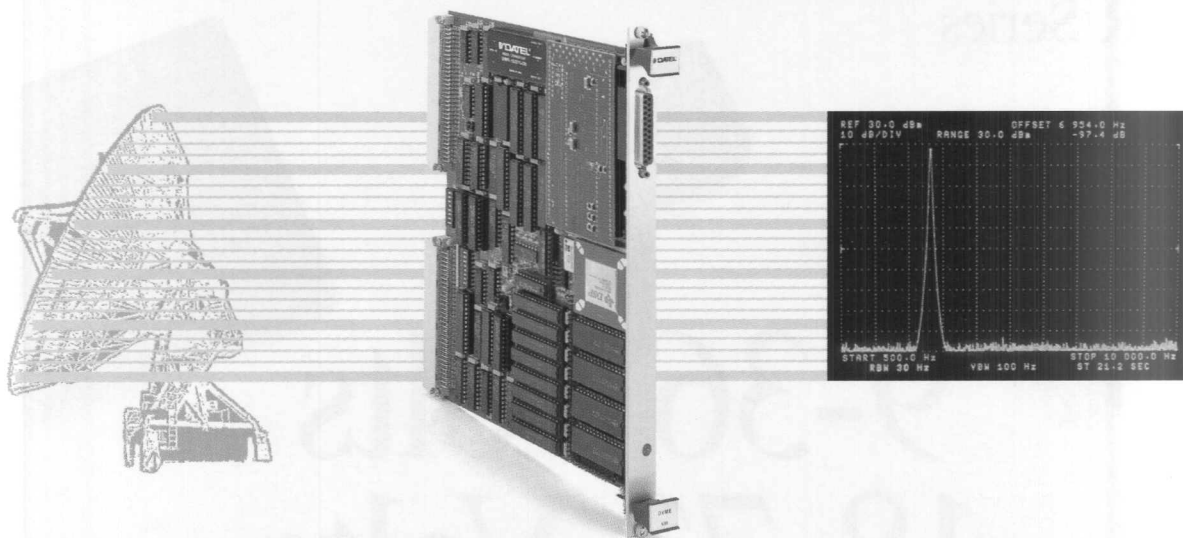
Meet the challenge of designing complex distributed power architectures in telecommunication, marine, portable instrument, and MPP computer applications. DATEL's new line of wide-input-range DC/DC converters are the cost-effective solution ... requiring the least amount of space ... and the smallest number of devices.

Call today for details on DATEL's complete line of DC/DC converters.

- 3, 10 and 20 Watt Outputs
- Fully Regulated/Isolated
- High Efficiencies (to 82% min.)
- Extended Temperature (-25 to +105°C)
- UL /CSA/IEC Certified
- Full EMI Testing Available
- 100% Burn-in @ Full Load
- Custom Designs for OEM's
- Very Low Cost

Unipolar Models	V _{in} Range (Volts)	V _{out} (Volts)	I _{out} (mA)	R/N (mV, p-p)	Efficiency (Min.)	Case
UWR-3.3/4850-D12	9 - 36	3.3	4850	75	77%	C4
UWR-5/4000-D12	9 - 36	5	4000	100	80%	C4
UWR-12/1650-D12	9 - 36	12	1650	100	81%	C4
UWR-15/1300-D12	9 - 36	15	1300	100	82%	C4
UWR-5/500-D48	18 - 72	5	500	120	75%	C1
UWR-12/250-D48	18 - 72	12	250	150	76%	C1
UWR-15/200-D48	18 - 72	15	200	150	76%	C1
UWR-3.3/1800-D48	18 - 72	3.3	1800	75	72%	C2
UWR-5/1800-D48	18 - 72	5	1800	75	77%	C2
UWR-12/750-D48	18 - 72	12	750	75	80%	C2
UWR-15/600-D48	18 - 72	15	600	75	80%	C2
UWR-3.3/4850-D48	18 - 72	3.3	4850	100	78%	C4
UWR-5/4000-D48	18 - 72	5	4000	100	80%	C4
UWR-12/1650-D48	18 - 72	12	1650	100	81%	C4
UWR-15/1300-D48	18 - 72	15	1300	100	82%	C4
Case Dimensions: C1 - 1.25" L x 0.80" W x 0.43" H C2 - 2.00" L x 1.00" W x 0.375" H C4 - 2.00" L x 2.00" W x 0.45" H						
Bipolar Models	V _{in} Range (Volts)	V _{out} (Volts)	I _{out} (mA)	R/N (mV, p-p)	Efficiency (Min.)	Case
BWR-5/1700-D12	9 - 36	±5	±1700	100	82%	C4
BWR-12/830-D12	9 - 36	±12	±830	100	81%	C4
BWR-15/670-D12	9 - 36	±15	±670	100	81%	C4
BWR-5/250-D48	18 - 72	±5	±250	120	73%	C1
BWR-12/125-D48	18 - 72	±12	±125	150	80%	C1
BWR-15/100-D48	18 - 72	±15	±100	150	80%	C1
BWR-5/700-D48	18 - 72	±5	±700	100	76%	C2
BWR-12/415-D48	18 - 72	±12	±415	75	79%	C2
BWR-15/330-D48	18 - 72	±15	±330	50	79%	C2
BWR-5/1700-D48	18 - 72	±5	±1700	100	81%	C4
BWR-12/830-D48	18 - 72	±12	±830	85	81%	C4
BWR-15/670-D48	18 - 72	±15	±670	85	82%	C4
Triple Models	V _{in} Range (Volts)	V _{out} (Volts)	I _{out} (mA)	R/N (mV, p-p)	Efficiency (Min.)	Case
TWR-5/3000-12/500-D12	9-36	+5/±12	3000/500	75/120	81%	C4
TWR-5/3000-15/500-D12	9-36	+5/±15	3000/500	75/120	81%	C4
TWR-5/1500-12/250-D48	18-72	+5/±12	1500/250	75/175	79%	C4
TWR-5/1800-12/200-D48	18-72	+5/±12	1800/200	75/175	81%	C4
TWR-5/1500-15/250-D48	18-72	+5/±15	1500/250	75/175	81%	C4
TWR-5/1800-15/150-D48	18-72	+5/±15	1800/150	75/175	80%	C4

For more details, see pages 2-8, 2-10 and 2-11.



Advanced VME A/D-D/A Boards for Signal Processing

Smart boards excel in DSP/FFT applications!

The unique architectures of DATEL's analog VME boards deliver superior performance. On-board DSP's (320C30, DVME-630) massage data to maximize "processed data bandwidths." Local A/D memory keeps collecting samples, with no lost data, while the OS services other tasks. Simultaneous sampling prevents data skew across parallel channels. High-bandwidth, low-noise inputs precisely preserve signals for DSP/FFT processing.

Our VME boards will make your system unique. Call DATEL today for your free catalog.

- **Select from more than 50 models**
- **Sample up to 10MHz A/D rates to memory**
- **Kill phase skew with quick, simultaneous sampling (2 channels, 2MHz each!)**
- **Capture pre/post-trigger transients directly to disk or memory**
- **Reduce noise/distortion with wide-bandwidth analog inputs for DSP/FFT applications**
- **Update 16 D/A's simultaneously at 330kHz**
- **Port DATEL UNIX and "C" software to any OS**

Model	Channels	Resolution	Speed	Data Memory	Notes
DVME-601 Series	16SE/8D A/D expandable to 160 ch.	12, 14 or 16 bits	To 300kHz	128k bytes	Local 68010 CPU, EXEC PROM library, SSH, PGA, isolation options
DVME-614 Series	16SE/8D A/D 1 D/A	12 or 14 bits	To 10MHz	16k samples FIFO	Simultaneous sampling, streaming design, 10MHz parallel port
DVME-622 Series	16 or 8 D/A simultaneous	12 bits	330kHz	--	16-channel simultaneous update, trigger/timer interrupt
DVME-630 Series	16SE/8D A/D	12 or 14 bits	To 10MHz	750k samples (w/MEM-30)	A/D-DSP coprocessor, 32/40MHz 320C30, "no programming" DSP library

For more details, see pages 5-4, 5-5 and 5-6.

DATEL
INNOVATION and EXCELLENCE

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hree years of materials research, component evaluations and thermal-management analysis have resulted in DATEL's New XWR Series of Wide Input Range DC/DC Converters. These fully encapsulated, highly efficient power converters are available in a variety of input voltage ranges (including 9-36V and 18-72V) and output configurations (including single, dual and triple outputs). All are input-overvoltage and output short-circuit protected.

This new family of modular, "plug-in" DC/DC converters exploits contemporary SMT on thick-film ceramic construction to achieve impressively small sizes and unmatched power densities. Their low prices are the result of our modern, high-speed, fully automated assembly process and our own high-speed automatic test equipment.

DC/DC Converters

All devices in the family are UL, CSA and IEC approved. All endure 100% burn-in at full load prior to final testing and achieve the longest MTBF's in their class.

If you can not find the specific device you need in the following tables, please contact us. We welcome the opportunity to work with you to develop an optimal solution. We have a large library of custom and special devices we've already developed, and may already have the exact device you require.

New Products	2-2
EMI/EMC Capabilities	2-6
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Product Selection Guides:	
XWR Series DC/DC Converters	
UWR Single Output Devices	2-8
BWR Dual Output Devices	2-10
TWR Triple Output Devices	2-11
UNR Series 5V/3.3V DC/DC Converters	2-12
AC/DC Converters	2-12
UPM/BPM Series DC/DC Converters	2-12
Package Dimensions and Pinouts	2-13



New Products



DIP Packaged 3 Watt DC/DC Converters

XWR Series, UWR/BWR Models

- Standard, 24-pin DIP form factor
- High-frequency, current-mode technology
- Single or dual outputs
- 5/12/15 Volt outputs
- Wide input voltage ranges:
 - 4.5 - 9 Volts
 - 9 - 36 Volts
 - 18 - 72 Volts
- Internal input/output filtering
- Minimum efficiencies to 82%
- Fully isolated/regulated/protected
- 0 to +75°C operation, no derating

See pages 2-8 and 2-10.

3.3 Volt DC/DC Converters

XWR/XNR Series, UWR/UNR Models

- Low-voltage outputs: 3.3V, 2.1V, others
- 4.6V to 72V inputs, 3 ranges
- Ideal for mixed 5V/3.3V systems
- Isolated and non-isolated designs
- 40+ Watts output power
- Active load sharing (opt.)
- Minimum efficiencies to 90%
- Low noise/ripple
- Superb line/load regulation
- Standard 2" x 1" & 2" x 2" packages

See page 2-8 for isolated models.

See page 2-12 for non-isolated models.

4-to-1 Ultra-Wide Input Range DC/DC Converters

XWR Series, "-D12" and "-D48" Models

- Single, dual or triple outputs
- 3.3/5/12/15 Volt outputs
- Ultra-wide input ranges:
 - 9 - 36 Volts
 - 18 - 72 Volts
- Ideal for telecomm or battery applications
- 3, 10 and 20 Watt outputs
- Fully regulated/isolated/protected
- Minimum efficiencies to 82%
- Extended temperatures (-25 to +105°C)
- UL (1950), CSA (22.2), IEC (950)
- Prolonged MTBF's
- Full EMI testing available

See pages 2-8, 2-10 and 2-11.

New Products



Miniature 1" x 1", 5 Watt DC/DC Converters

XWR Series, UWR/BWR Models

- Compact size:
1" x 1" x 0.45"
25mm x 25mm x 11.4mm
- Single or dual outputs
- 5/12/15 Volt outputs
- Wide range inputs:
18 - 36 Volts
36 - 72 Volts
- Power densities to 11.2W/in³
- Fully regulated/isolated (500Vac min.)
- Overvoltage and short-circuit protected
- Minimum efficiencies to 80%
- Extended temperatures (-25 to +105°C)

See pages 2-8 and 2-10.

The Smallest Triple Output DC/DC Converters

XWR Series, TWR Models

- Compact size:
2" x 1" x 0.375"
51mm x 25mm x 9.5mm
- Output power to 11 Watts
- Power densities to 14.7W/in³
- Output voltages +5V/±12V or +5V/±15V
- Wide input voltage ranges:
4.7 - 7 Volts
9 - 18 Volts
- Modern SMT on ceramic construction
- Fully regulated/isolated/protected
- Minimum efficiencies to 82%
- Extended temperatures (-25 to +105°C)
- Industry-standard pinout
- Shielded cases (with insulated bottoms)

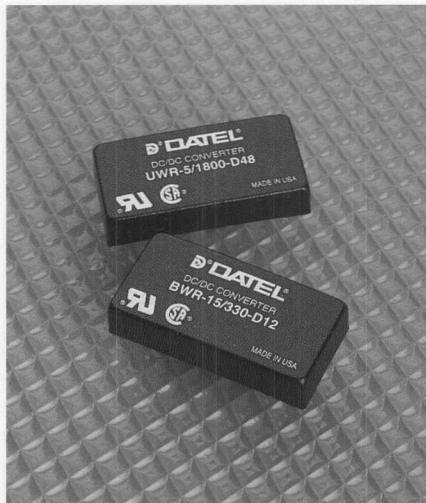
See page 2-11.

Custom DC/DC Designs for OEM Applications

- Wide, ultra-wide or narrow input ranges
- Single or multiple outputs
- High (>300V) or low-voltage (<2V) outputs
- Output power to 100 Watts
- Ultra-high efficiencies (90%+)
- Isolated and non-isolated designs
- High isolation capability
- Extended temperature ranges
- Current sensing, smart load sharing
- Special input/output filtering
- Low-profile (<0.3") packaging
- Full environmental screening capability
- In-house magnetics laboratory
- In-house EMI/EMC testing capabilities
- Intrinsically safe designs

See page 2-7.

New Products



The Only Wide-Range 5 Volt Input DC/DC Converters

XWR Series, "-D5" Models

- Single, dual or triple outputs
- 3.3/5/12/15 Volt outputs
- 3, 10 and 20 Watt outputs
- Wide input voltage ranges:
 - 4.7 - 7 Volts
 - 4.5 - 9 Volts
 - 4.6 - 13.2 Volts
- Industry-standard pinouts
- Power densities to 11W/in³
- Fully isolated/regulated/protected
- Extended temperatures (-25 to +105°C)
- UL (1950), CSA (22.2), IEC (950)

See pages 2-8, 2-10 and 2-11.

High-Density 2" x 1", 10 Watt DC/DC Converters

XWR Series, UWR/BWR/TWR Models

- Compact size:
 - 2" x 1" x 0.375"
 - 51mm x 25mm x 9.5mm
- Single, dual or triple outputs
- 3.3/5/12/15 Volt outputs
- 4.5V to 72V inputs (3 ranges)
- Power densities to 13.3W/in³
- Current-mode topologies
- Industry-standard pinouts
- Modern SMT on ceramic construction
- Minimum efficiencies to 82%
- Overcurrent and short-circuit protection
- Reverse-polarity input protection
- Low ripple/noise, superb line/load regulation

See pages 2-8, 2-10 and 2-11.

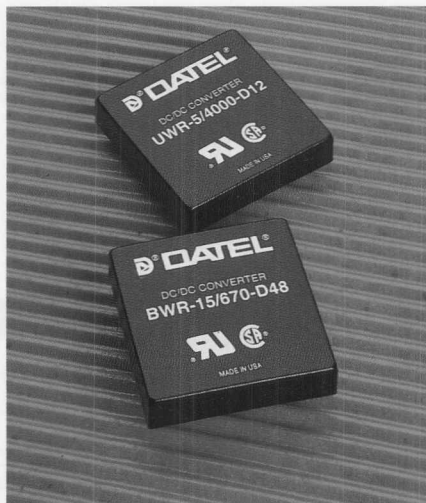
High-Reliability Hermetically Sealed DC/DC Converters

XHR Series

- Single, dual or triple outputs
- 5/12/15 Volt outputs
- Ruggedized designs
- All metal/ceramic package construction
- Heavy, 60 mil, ceramic substrates
- Fully specified operation from -40 to +105°C
- EMI/RFI shielding
- Environmental screening per MIL-STD-883
- Fine and gross leak testing
- Vibration and shock testing
- High-altitude applications
- Full EMI/EMC testing

Contact D'ATEL.

New Products



TTL-to-ECL 5V to -5.2V DC/DC Converters

UWR-5.2 Models

- Ideal for mixed-logic systems
- 8 Watt output in a 2" x 1" case
- 16 Watt output in a 2" x 2" case
- Output accuracy $\pm 1\%$
- 4.7 - 13.2V input range (16W model)
- Fully isolated to 500Vdc minimum
- Low noise/ripple, excellent line/load regulation
- Modern SMT on ceramic construction
- Excellent thermal management
- Wide operating temperature ranges
- Industry-standard pinouts
- Prolonged MTBF's

See page 2-8.

20 Watt, 2" x 2" Fully Encapsulated DC/DC Converters

XWR Series, UWR/BWR/TWR Models

- Compact size:
2" x 2" x 0.45"
51mm x 51mm x 11.4mm
- Single, dual or triple outputs
- 3.3/5/12/15 Volt Outputs
- Numerous input ranges including:
18V - 72V for telecom
9V - 36V for automotive
- Industry-standard pinouts
- External V_{OUT} trim
- Remote on/off control
- Fully isolated/regulated/protected
- Wide operating temperature range
- UL (1950), CSA (22.2), IEC (950)

See pages 2-8, 2-10 and 2-11.

5V-to-3.3V, Non-Isolated 26 and 40 Watt DC/DC Converters

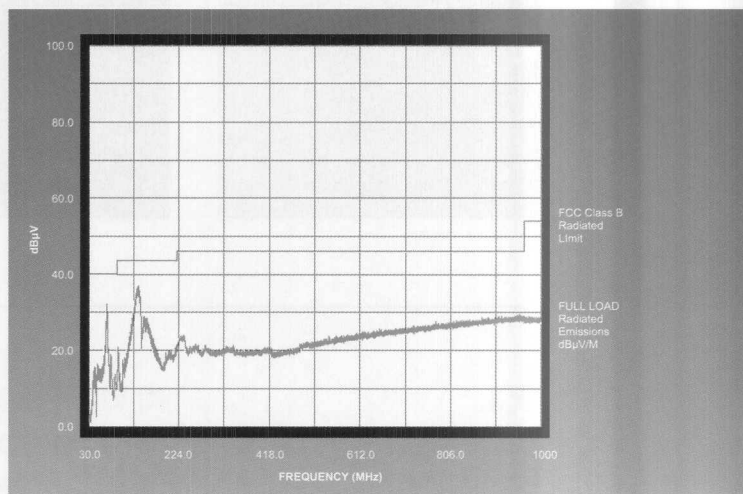
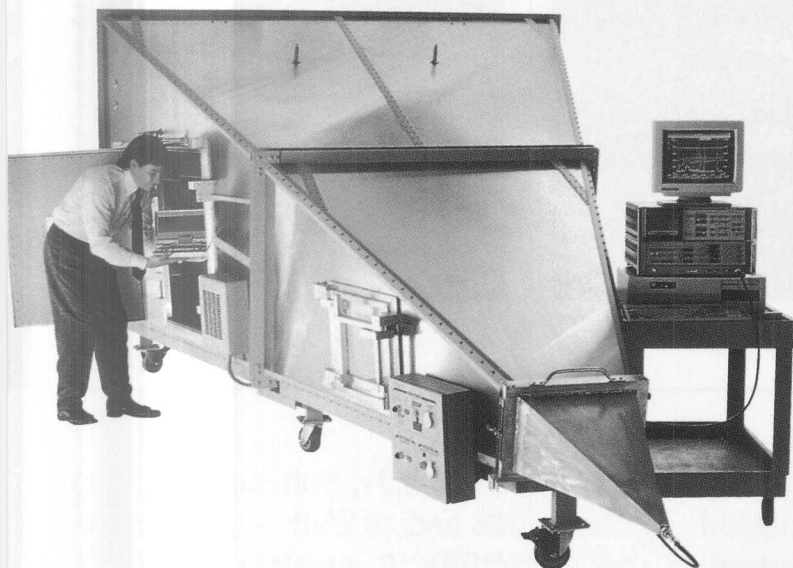
UNR Series

- Low cost
- For mixed 5V/3.3V applications
- 4.5 - 5.5V input range
- Efficiencies to 87%
- Modern thermal management
- SMT on ceramic construction
- No heat sink required
- Small packages:
2" x 1" (8 Amps)
2" x 2" (12 Amps)
- $\pm 0.5\%$ max. load regulation (10-100% load)
- Optional active load sharing and current sense

See page 2-12.

EMI/EMC Capabilities

When It Comes to EMI/EMC ... We Let The Other Guys Make The Noise!



FCC Class B Radiated Emissions Plot - UWR 10 Watt Series - Full Load

- Full EMC Evaluation(Precompliance)
- Radiated Emissions and Immunity
- Fully Automated Test System
- EMCO GTEM 5305 (30MHz to 1 GHz)
- Emissions Testing To:
 - FCC15 & FCC18
 - VDE087 & VDE0875
 - CISPR 22
 - EN55022
- ESD Immunity Testing To IEC 801-2
- Radiated Immunity Testing to IEC 801-3

Consider DATEL's new DC/DC converters for your critical applications requiring electromagnetic compatibility (EMC). We recently constructed one of the most complete in-house EMI/EMC test facilities of any major power supply manufacturer. We have begun certifying our standard products to the more popular emissions standards, and as each test is completed, the results will be made available

to our customers. In the meantime, we're happy to perform any specific EMI/EMC testing your application requires.

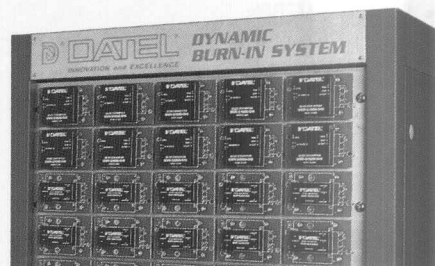
All new products currently in development are submitted for EMI/EMC testing early in the process so any potential problems can be detected and corrected long before the products are introduced.

Qualification Testing and Long Term Reliability

To ensure you continue receiving the quality and reliability you've come to expect from DATEL power converters, all our new products are submitted to a 6-week verification/qualification process that includes high and low-temperature storage, thermal shock, vibration, mechanical shock, life test, etc. Our highly automated assembly facility exploits MRPII, JIT and SPC manufacturing procedures, and we are currently pursuing ISO-9001 certification.



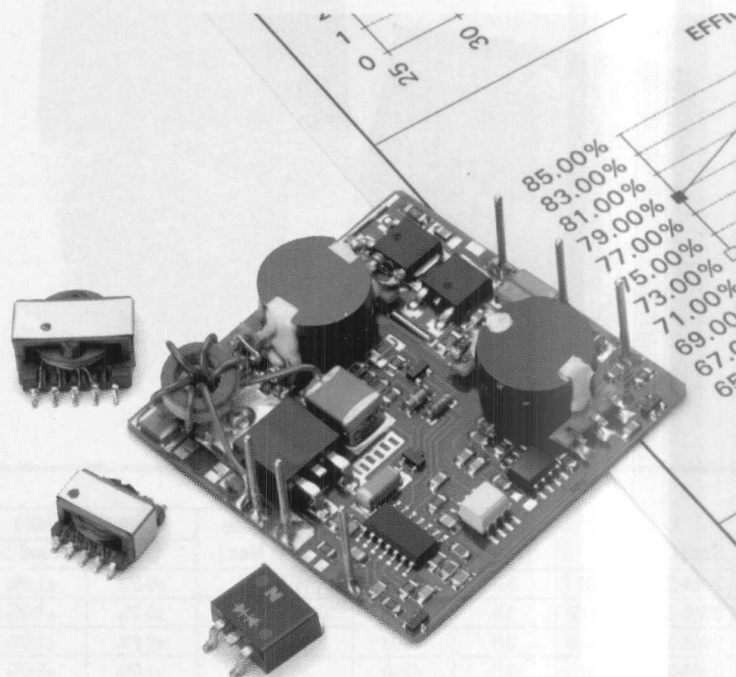
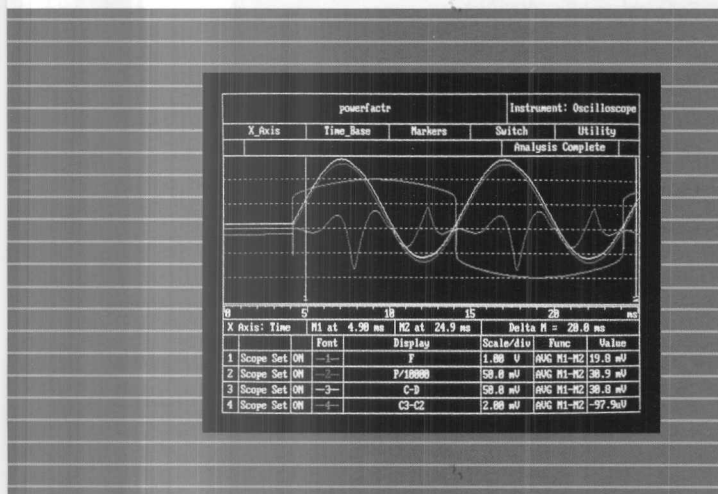
Temperature/Humidity and Temperature Cycling



Dynamic Burn-in System

Custom DC/DC Designs for OEM Applications

High-Reliability Power Converters ... In Time and On Budget!

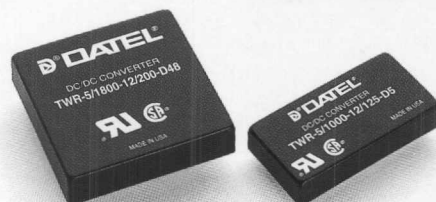


- Narrow or ultra-wide input ranges
- Single or multiple outputs
- High or low-voltage (<2V) outputs
- Output power to 100 Watts
- Isolated and non-isolated designs
- Smart load sharing
- Extended temperature ranges
- High-speed, automatic SMT assembly
- Calculated and demonstrated MTBF's
- Burn-in / HALT / HASS
- Environmental screening
- EMI testing

The unique cost/performance/size objectives of your new high-density power distribution system may require unique DC/DC converters. DATEL's world-class design, development and manufacturing team stands ready to define, design and assemble the exact power solution you need.

DATEL has compiled a large library of DC/DC designs that are currently used in a variety of telecommunications, medical, computer, railway, aerospace and industrial applications. We may already have the converter you need.

When reliability, delivery and cost are crucial, look to the leader ...DATEL.



We've designed numerous custom DC/DC converters for many specific and esoteric applications:

- Low-profile devices with heights of 0.275"
- Devices with 5-to-1 ultra-wide input ranges
- High-density devices (26 Watts in a 2" x 1" package) that do not require heat sinks
- Very low output voltage (<1.8V) devices
- Hermetically sealed devices for harsh environments and -40°C operation
- Devices for railway applications requiring 4000Vdc isolation and prolonged surge protection
- Intrinsically safe devices with an actual physical separation between all input and output components

XWR Series, Single Output

Wide Input Range

3, 5, 10, 20 Watt DC/DC Converters



- Wide input ranges (including 9-36V and 18-72V)
- 3.3V, 5V, 5.2V, 12V or 15V Outputs
- Wide operating temperature ranges
- Minimum efficiencies to 82%
- Small size, power densities to 13.3W/in³
- Fully isolated (to 1000Vdc)
- Superb line/load regulation
- Reverse polarity input protection
- Synchronization and output voltage adjustment (20W models only)
- UL 1950, CSA 22.2 No. 234, and IEC 950 approved
- Shielded cases (5, 10 and 20 Watt models)
- Modifications and customs for OEM's

Model	Output					Input			Efficiency (Min.)	Package ③ (Case, Pinout)
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVp-p, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)	Range (Volts)	I _{IN} ② (mA)		
				Line	Load ①					
UWR-3.3/1800-D5	3.3	1800	50	±0.2%	±1.0%	5	4.7-7	30/1770	69%	C2, P3
UWR-3.3/2500-D12	3.3	2500	50	±0.2%	±1.0%	12	9-18	30/958	74%	C2, P3
UWR-3.3/1800-D48	3.3	1800	75	±0.2%	±1.0%	48	18-72	15/177	72%	C2, P3
UWR-3.3/4250-D5	3.3	4250	75	±1.0%	±2.0%	5	4.6-13.2	30/4020	72%	C4, P6
UWR-3.3/4850-D12	3.3	4850	75	±1.0%	±2.0%	12	9-36	25/1800	77%	C4, P6
UWR-3.3/4850-D48	3.3	4850	100	±1.0%	±2.0%	48	18-72	25/440	78%	C4, P6
UWR-5/500-D5	5	500	120	±0.2%	±0.5%	5	4.5-9	25/721	70%	C1, P1
UWR-5/500-D12	5	500	120	±0.2%	±0.5%	12	9-18	35/300	70%	C1, P1
UWR-5/500-D48	5	500	120	±0.2%	±0.5%	48	18-72	10/70	75%	C1, P1
UWR-5/900-D24	5	900	75	±1.0%	±2%	24	18-36	20/260	80%	C7, P3
UWR-5/1000-D48	5	1000	75	±1.0%	±2%	48	36-72	20/130	80%	C7, P3
UWR-5/1600-D5	5	1600	50	±0.2%	±0.5%	5	4.7-7	30/2240	72%	C2, P3
UWR-5/2000-D12	5	2000	50	±0.3%	±0.5%	12	9-18	15/1080	78%	C2, P3
UWR-5/1800-D48	5	1800	75	±0.3%	±0.5%	48	18-72	25/278	77%	C2, P3
UWR-5/3000-D5	5	3000	50	±0.2%	±0.5%	5	4.6-13.2	30/3930	77%	C4, P6
UWR-5/4000-D12	5	4000	100	±0.3%	±0.5%	12	9-36	25/2080	80%	C4, P6
UWR-5/4000-D48	5	4000	100	±0.3%	±0.5%	48	18-72	25/526	80%	C4, P6
UWR-5.2/1500-D5	5.2	1500	75	±0.2%	±0.5%	5	4.7-7	50/2300	73%	C2, P3
UWR-5.2/3000-D5	5.2	3000	75	±0.2%	±0.5%	5	4.7-13.2	33/4000	78%	C4, P6

① 10% to 100% load.

② Nominal line voltage, no load/full load conditions.

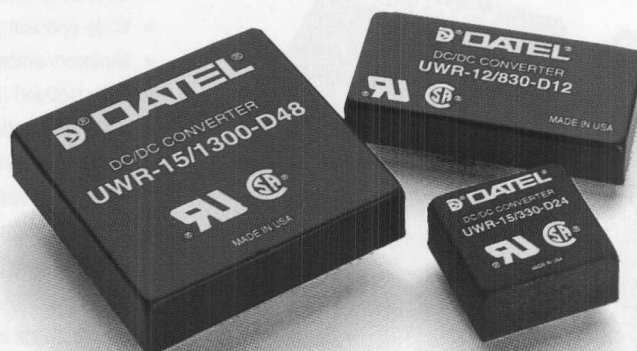
③ Refer to page 2-13 for mechanical dimensions.

Contact your local DATEL sales office for data sheets on products listed in this catalog

XWR Series, Single Output

Wide Input Range

3, 5, 10, 20 Watt DC/DC Converters



Model	Output					Input			Efficiency (Min.)	Package ③ (Case, Pinout)
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVp-p, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)	Range (Volts)	I _{IN} ② (mA)		
				Line	Load ①					
UWR-12/250-D5	12	250	150	±0.5%	±0.5%	5	4.5-9	50/841	72%	C1, P1
UWR-12/250-D12	12	250	150	±0.5%	±0.5%	12	9-18	35/350	72%	C1, P1
UWR-12/250-D48	12	250	150	±0.5%	±0.5%	48	18-72	20/81	76%	C1, P1
UWR-12/415-D24	12	415	75	±1.0%	±2.0%	24	18-36	15/263	80%	C7, P3
UWR-12/415-D48	12	415	75	±1.0%	±2.0%	48	36-72	15/131	80%	C7, P3
UWR-12/665-D5	12	665	75	±0.2%	±0.5%	5	4.7-7	65/2225	73%	C2, P3
UWR-12/830-D12	12	830	75	±0.3%	±0.5%	12	9-18	35/1050	80%	C2, P3
UWR-12/750-D48	12	750	75	±0.3%	±0.5%	48	18-72	15/260	80%	C2, P3
UWR-12/1250-D5	12	1250	75	±0.2%	±0.5%	5	4.6-13.2	90/3880	79%	C4, P6
UWR-12/1650-D12	12	1650	100	±0.3%	±0.5%	12	9-36	30/2060	81%	C4, P6
UWR-12/1650-D48	12	1650	100	±0.3%	±0.5%	48	18-72	25/514	81%	C4, P6
UWR-15/200-D5	15	200	150	±0.5%	±0.5%	5	4.5-9	50/841	72%	C1, P1
UWR-15/200-D12	15	200	150	±0.5%	±0.5%	12	9-18	35/350	72%	C1, P1
UWR-15/200-D48	15	200	150	±0.5%	±0.5%	48	18-72	20/81	76%	C1, P1
UWR-15/330-D24	15	330	75	±1.0%	±2.0%	24	18-36	12/262	80%	C7, P3
UWR-15/330-D48	15	330	75	±1.0%	±2.0%	48	36-72	12/131	80%	C7, P3
UWR-15/530-D5	15	530	75	±0.2%	±0.5%	5	4.7-7	65/2250	73%	C2, P3
UWR-15/665-D12	15	665	75	±0.3%	±0.5%	12	9-18	35/1050	81%	C2, P3
UWR-15/600-D48	15	600	75	±0.3%	±0.5%	48	18-72	10/234	80%	C2, P3
UWR-15/1000-D5	15	1000	75	±0.2%	±0.5%	5	4.6-13.2	75/3780	80%	C4, P6
UWR-15/1300-D12	15	1300	100	±0.3%	±0.5%	12	9-36	30/2000	82%	C4, P6
UWR-15/1300-D48	15	1300	100	±0.3%	±0.5%	48	18-72	30/495	82%	C4, P6

① 10% to 100% load.

② Nominal line voltage, no load/full load conditions.

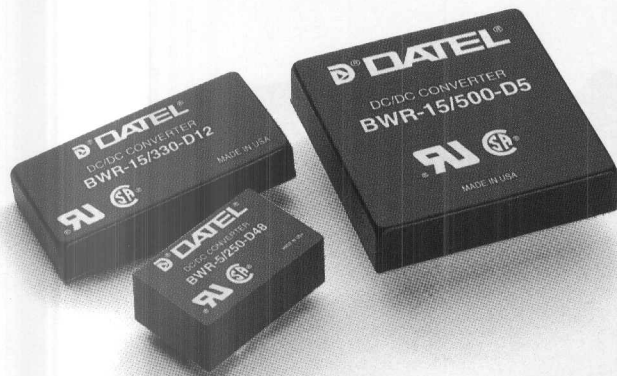
③ Refer to page 2-13 for mechanical dimensions.

Contact DATEL for special requirements

XWR Series, Dual Output

Wide Input Range

3, 5, 10, 20 Watt DC/DC Converters



- Wide input ranges (including 9-36V and 18-72V)
- $\pm 5V$, $\pm 9V$, $\pm 12V$ or $\pm 15V$ Outputs
- Wide operating temperature ranges
- Minimum efficiencies to 82%
- Fully isolated (to 1000Vdc)
- Excellent line/load regulation
- Overcurrent and short-circuit protection
- Reverse polarity input protection
- Synchronization and output voltage adjustment (20W models only)
- Shielded cases (5, 10 and 20 Watt models)
- UL 1950, CSA 22.2 No. 234 and IEC 950 approved
- Modifications and customs for OEM's

Model	Output					Input			Efficiency (Min.)	Package ③ (Case, Pinout)
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVp-p, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)	Range (Volts)	I _{IN} ② (mA)		
				Line	Load ①					
BWR-5/250-D12	±5	±250	120	±0.5%	±1.0%	12	9-18	35/278	75%	C1, P2
BWR-5/250-D48	±5	±250	120	±0.5%	±1.0%	48	18-72	10/76	73%	C1, P2
BWR-5/500-D24	±5	±500	75	±1.0%	±2.0%	24	18-36	25/260	80%	C7, P4
BWR-5/500-D48	±5	±500	75	±1.0%	±2.0%	48	36-72	20/130	80%	C7, P4
BWR-5/700-D5	±5	±700	75	±0.3%	±2.0%	5	4.7-7	50/1936	75%	C2, P4
BWR-5/800-D12	±5	±800	75	±0.3%	±1.0%	12	9-18	40/874	77%	C2,P4
BWR-5/700-D48	±5	±700	100	±0.4%	±1.0%	48	18-72	25/250	76%	C2, P4
BWR-5/1500-D5	±5	±1500	75	±0.3%	±1.0%	5	4.6-13.2	90/3880	78%	C4, P7
BWR-5/1700-D12	±5	±1700	100	±0.3%	±1.0%	12	9-36	40/1730	82%	C4, P7
BWR-5/1700-D48	±5	±1700	100	±0.4%	±1.0%	48	18-72	10/425	81%	C4, P7
BWR-9/850-D5	±9	±850	150	±0.3%	±2.0%	5	4.6-13.2	70/4000	78%	C4, P7
BWR-12/105-D5	±12	±105	150	±0.5%	±1.0%	5	4.5-9	75/727	70%	C1, P2
BWR-12/125-D12	±12	±125	150	±0.5%	±1.0%	12	9-18	35/346	73%	C1, P2
BWR-12/125-D48	±12	±125	150	±0.5%	±1.0%	48	18-72	10/79	80%	C1, P2
BWR-12/210-D24	±12	±210	75	±1.0%	±2.0%	24	18-36	30/262	80%	C7, P4
BWR-12/210-D48	±12	±210	75	±1.0%	±2.0%	48	36-72	20/131	80%	C7, P4
BWR-12/335-D5	±12	±335	25	±0.2%	±2.0%	5	4.7-7	45/2660	74%	C2, P4
BWR-12/415-D12	±12	±415	25	±0.3%	±2.0%	12	9-18	45/1035	81%	C2, P4
BWR-12/415-D48	±12	±415	75	±0.4%	±1.0%	48	18-72	15/265	79%	C2,P4
BWR-12/625-D5	±12	±625	75	±0.3%	±1.0%	5	4.6-13.2	90/3830	79%	C4, P7
BWR-12/830-D12	±12	±830	100	±0.3%	±1.0%	12	9-36	40/2000	81%	C4, P7
BWR-12/830-D48	±12	±830	85	±0.4%	±1.0%	48	18-72	25/517	81%	C4, P7
BWR-15/85-D5	±15	±85	150	±0.5%	±1.0%	5	4.5-9	100/736	70%	C1, P2
BWR-15/100-D12	±15	±100	150	±0.5%	±1.0%	12	9-18	35/346	73%	C1, P2
BWR-15/100-D48	±15	±100	150	±0.5%	±1.0%	48	18-72	10/79	80%	C1, P2
BWR-15/150-D24	±15	±150	75	±1.0%	±2.0%	24	18-36	30/262	80%	C7, P4
BWR-15/150-D48	±15	±150	75	±1.0%	±2.0%	48	36-72	20/131	80%	C7, P4
BWR-15/275-D5	±15	±275	25	±0.3%	±2.0%	5	4.7-7	75/2314	74%	C2, P4
BWR-15/330-D12	±15	±330	25	±0.3%	±2.0%	12	9-18	45/1020	82%	C2, P4
BWR-15/330-D48	±15	±330	50	±0.4%	±1.0%	48	18-72	15/264	79%	C2, P4
BWR-15/500-D5	±15	±500	75	±0.3%	±1.0%	5	4.6-13.2	90/3780	80%	C4, P7
BWR-15/670-D12	±15	±670	100	±0.3%	±1.0%	12	9-36	40/2000	81%	C4, P7
BWR-15/670-D48	±15	±670	85	±0.4%	±1.0%	48	18-72	25/522	82%	C4, P7

^① Balanced loads, 20% to 100% load.

^② Nominal line voltage, no load/full load conditions.

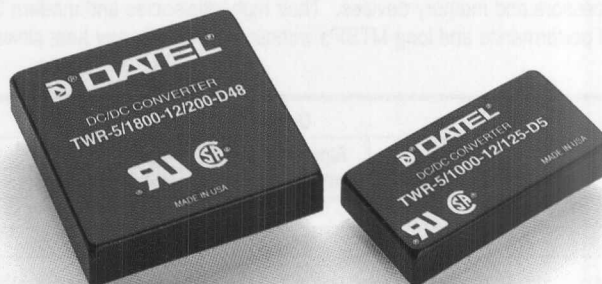
^③ Refer to page 2-13 for mechanical dimensions.

XWR Series, Triple Output

Wide Input Range

10, 15 and 20 Watt DC/DC Converters

- Wide input ranges (including 9-36V and 18-72V)
- Outputs of +5V/±12V or +5V/±15V
- Minimum efficiencies to 82%
- Standard 2" x 1" and 2" x 2" packages
- Wide operating temperature ranges
- Fully isolated (500Vdc minimum)
- Short-circuit and reverse-polarity protection
- Shielded cases (with insulated bottoms)
- UL 1950, CSA 22.2 No. 234 and IEC 950 approved
- Modifications and customs for OEM's



Model	Output					Input			Efficiency (Min.)	Package ④ (Case, Pinout)
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise ① (mVp-p, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)	Range (Volts)	I _N ③ (mA)		
				Line	Load ②					
TWR-5/1000-12/125-D5	+5	1000	75	±1.0%	±2.0%	5	4.7-7	45/2200	73%	C3, P5
	±12	±125	120	±1.0%	±5.0%					
TWR-5/1000-12/210-D12	+5	1000	75	±1.0%	±2.0%	12	9-18	25/1050	81%	C3, P5
	±12	±210	120	±1.0%	±5.0%					
TWR-5/3000-12/500-D12 ⑤	+5	3000	75	±1.0%	±2.0%	12	9-36	25/2083	81%	C4, P8
	±12	±500	120	±1.0%	±5.0%					
TWR-5/1200-12/250-D48	+5	1200	75	±1.0%	±2.0%	48	18-72	15/320	81%	C4, P8
	±12	±250	175	±1.0%	±5.0%					
TWR-5/1500-12/250-D48	+5	1500	75	±1.0%	±2.0%	48	18-72	20/360	79%	C4, P8
	±12	±250	175	±1.0%	±5.0%					
TWR-5/1800-12/200-D48	+5	1800	75	±1.0%	±2.0%	48	18-72	15/350	81%	C4, P8
	±12	±200	175	±1.0%	±5.0%					
TWR-5/800-15/150-D5	+5	800	75	±1.0%	±1.0%	5	4.7-7	50/2320	73%	C3, P5
	±15	±150	150	±1.0%	±5.0%					
TWR-5/1000-15/200-D12	+5	1000	75	±1.0%	±1.0%	12	9-18	30/1120	82%	C3, P5
	±15	±200	150	±1.0%	±5.0%					
TWR-5/3000-15/500-D12 ⑤	+5	3000	75	±1.0%	±1.0%	12	9-36	30/2083	81%	C4, P8
	±15	±500	120	±1.0%	±5.0%					
TWR-5/1000-15/250-D48	+5	1000	75	±1.0%	±1.0%	48	18-72	15/330	79%	C4, P8
	±15	±250	175	±1.0%	±5.0%					
TWR-5/1500-15/250-D48	+5	1500	75	±1.0%	±1.0%	48	18-72	15/390	81%	C4, P8
	±15	±250	175	±1.0%	±5.0%					
TWR-5/1800-15/150-D48	+5	1800	75	±1.0%	±1.0%	48	18-72	15/350	80%	C4, P8
	±15	±150	175	±1.0%	±5.0%					

① For "-D5" and "-D12" models, ±12V or ±15V outputs are specified with 10µF, 25V output capacitors.

② 5V output, 10-100% load. ±12V or ±15V outputs, balanced loads, 20-100% load. For "-D48" models, "R" versions offer improved load regulation on the ±12V or ±15V outputs. Contact DATEL for details.

③ Nominal line voltage, no load/full load conditions.

④ Refer to page 2-13 for mechanical dimensions.

⑤ For the models indicated, maximum output power is 20 Watts for any combination of primary (+5V) and auxiliary (±12V or ±15V) currents up to the limits indicated in the part number. For example, if the TWR-5/3000-15/500-D12 is supplying 500mA from both its 15V outputs (15 Watts), only 1000mA can be supplied by the +5V output (20 Watts total).

Contact DATEL for special requirements

Contact your local DATEL sales office for data sheets on products listed in this catalog

UNR Series

Non-Isolated, 5V-to-3.3V DC/DC Converters

For today's mixed 5V/3.3V applications, DATEL has developed a line of low-cost, high-efficiency, non-isolated, 5V-to-3.3V DC/DC converters. With 8 Amp (2" x 1" package) and 12 Amp (2" x 2" package) outputs, these devices are more than capable of driving the newest microprocessors and memory devices. Their high efficiencies and modern SMT-on-ceramic construction enable them to achieve full rated performance and long MTBF's without the need for any heat sinking. Contact DATEL for more details.

Model	Output					Input			Efficiency (Min.)	Package ④ (Case)
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVp-p, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)	Range (Volts)	I _N ② (mA)		
				Line	Load ①					
UNR-3.3/8000-D5	3.3	8000	55 ③	±0.2%	±0.5%	5	4.5-5.5	30/5900	87%	C5
UNR-3.3/12000-D5	3.3	12000	55 ③	±0.2%	±0.5%	5	4.5-5.5	30/9150	85%	C6

① 10% to 100% load.

② Nominal line voltage, no load/full load conditions.

③ External input and output capacitors required.

④ Refer to page 2-13 for mechanical dimensions.

AC/DC Converters

Our popular line of AC/DC converters includes devices in a number of different configurations. "PM" devices are plug-in type potted modules with single, dual or triple outputs. "CM" devices are chassis mounted with connections made to a terminal strip on top of the modules. The USC-5/5 is a chassis mounted switching AC/DC with a 5V/5A output. The UPA-5/500 is a wall plug-in unit offering 5V/500mA of isolated output power. All are current limited and short-circuit protected.

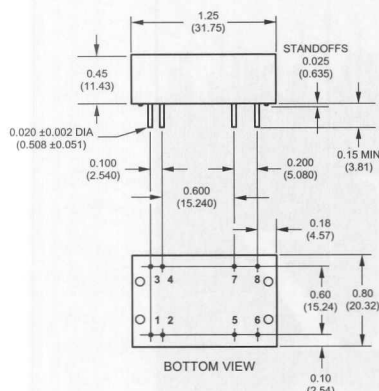
Performance Specifications								Common Specifications	
Model	Output					Input	Package Size (inches)	Input Voltage Range 115Vac (±10%,60-440Hz) Temperature Coefficient ±0.02%/°C Transient Recovery Time 50µsec Breakdown Voltage 1500Vac Case Material Phenolic Output Accuracy ±1% Isolation Resistance 100MOhms Operating Temperature -25 to +71°C Storage Temperature -25 to +85°C	
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVrms, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)			
				Line	Load				
BCM-15/300	±15	±300	2	±0.02%	±0.05%	115Vac	2.5 x 3.5 x 1.56		
BPM-15/300	±15	±300	2	±0.02%	±0.05%	115Vac	2.5 x 3.5 x 1.56		
TPM-12/150-5/1000	±12, 5	±150, 1000	2, 1	±0.02%, 0.05%	±0.05%, 0.1%	115Vac	2.5 x 3.5 x 1.56		
TPM-15/150-5/1000	±15, 5	±150, 1000	2, 1	±0.02%, 0.05%	±0.05%, 0.1%	115Vac	2.5 x 3.5 x 1.56		
UCM-5/2000	5	2000	1	±0.05%	±0.1%	115Vac	2.5 x 3.5 x 1.56		
UPA-5/500	5	500	8	±0.3%	±0.3%	115Vac	Wall Plug-in		
UPM-5/2000	5	2000	1	±0.05%	±0.1%	115Vac	2.5 x 3.5 x 1.56		
USC-5/5	5	5000	50mVp-p	±0.05%	±0.1%	115Vac	2.5 x 3.5 x 1.56		

UPM/BPM Series

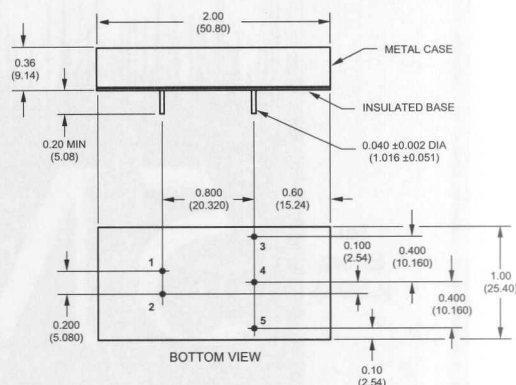
1-4.5 Watt, Single and Dual DC/DC Converters

Performance Specifications								Common Specifications	
Model	Output					Input	Package Size (inches)	Input Voltage Range ±10% Temperature Coefficient ±0.02%/°C Transient Recovery Time 50µsec Breakdown Voltage 300Vdc, Min. Case Material Diallyl Phthalate Output Accuracy ±1% Operating Temperature −25 to +71°C Storage Temperature −55 to +85°C	
	V _{OUT} (Volts)	I _{OUT} (mA)	Ripple/Noise (mVrms, Max.)	Regulation (Max.)		V _{IN} Nom. (Volts)			
				Line	Load				
UPM-5/200-D12	5	200	2	±0.05%	±0.1%	12	2.0 x 1.5 x 0.375		
UPM-28/25-D5	28	25	2	±0.05%	±0.05%	5	2.0 x 1.5 x 0.375		
UPM-28/100-D5	28	100	2	±0.05%	±0.05%	5	2 x 2 x 0.4		
BPM-12/25-D5	±12	±25	2	±0.05%	±0.05%	5	2.0 x 1.5 x 0.375		
BPM-15/150-D5	±15	±150	1	±0.05%	±0.05%	5	2 x 2 x 0.4		
BPM-15/150-D28	±15	±150	1	±0.05%	±0.05%	28	2 x 2 x 0.4		

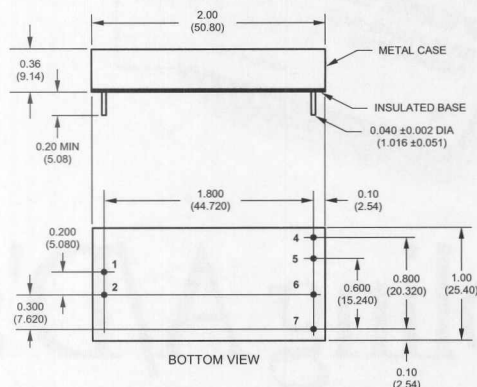
C1



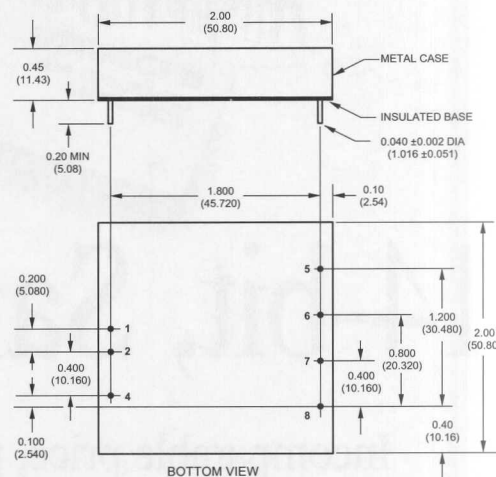
C2



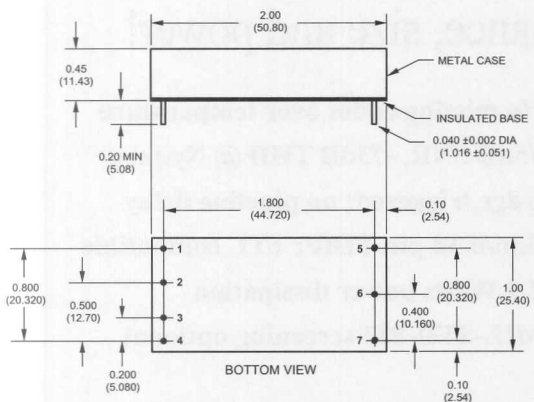
C3



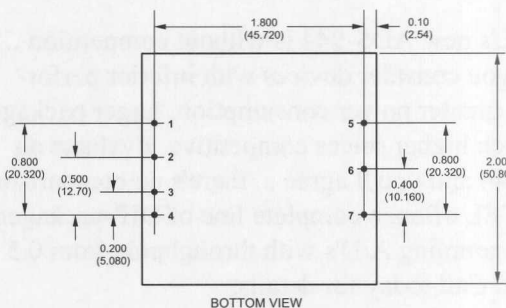
C4



C5



C6



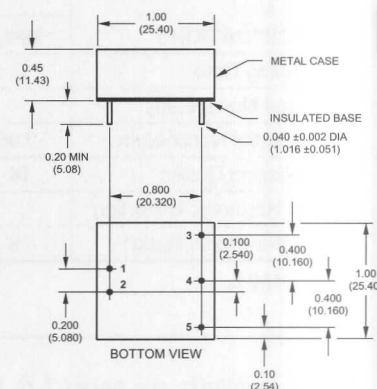
NOTE: Dimensions in inches (millimeters), tolerance 2 place ±0.02 (±0.51), 3 place ±0.010 (±0.254).

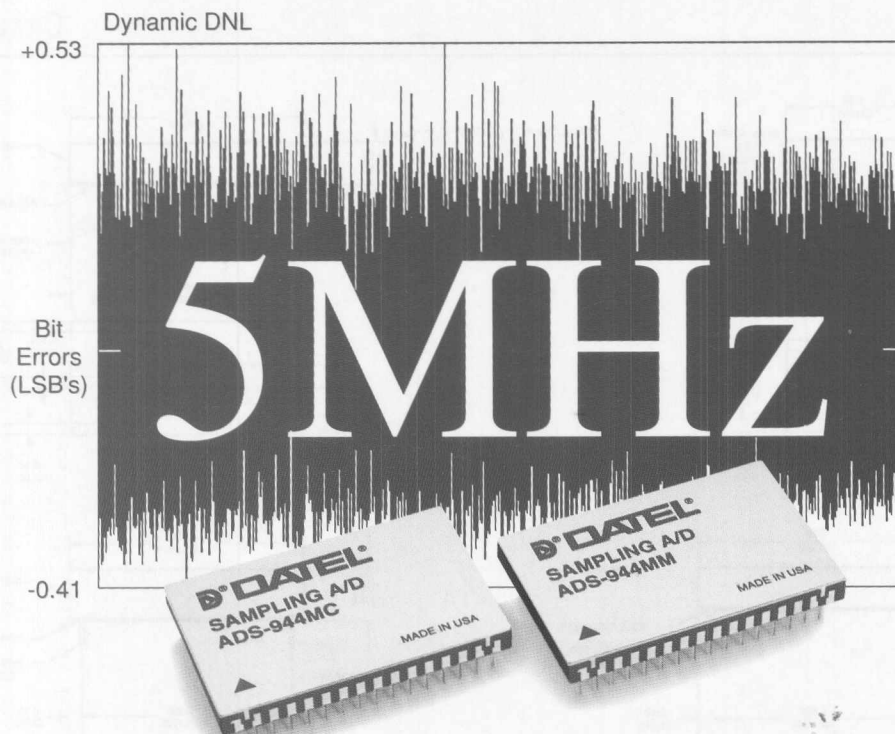
I/O Connections

PIN	P1	P2	P3	P4	P5	P6	P7	P8	P9
1	+Input	+Input	+Input	+Input	+Input	+Input	+Input	+Input	Common
2	+Input	+Input	-Input	-Input	-Input	-Input	-Input	-Input	Control
3	-Input	-Input	+Output	+Output	No Pin	No Pin	No Pin	No Pin	No Pin
4	-Input	-Input	No Pin	Common	+12V/15V Out	Control	Control	No Pin	No Pin
5	Common	Common	Common	-Output	-12V/15V Out	No Pin	+Output	+12V/15V Out	+Output
6	+Output	+Output	No Pin	No Pin	Common	+Output	Common	+5V Out	Common
7	Common	Common	No Pin	No Pin	+5V Out	Common	-Output	Common	+Input
8	+Output	-Output	No Pin	No Pin	No Pin	Trim	Trim	-12V/15V Out	No Pin

NOTE: Metal cases C2 - C7 are connected internally to the -Inputs, except "D48" models whose cases are connected to the +Inputs.

C7





14-bit, Sampling A/D's

Incomparable price, performance, size and power!

DATEL's new ADS-944 is without competition ... unless you consider devices with inferior performance, greater power consumption, larger packages and much higher prices competitive. Evaluate an ADS-944 and you'll agree ... there's no comparison.

DATEL offers a complete line of DIP-packaged, 14-bit, sampling A/D's with throughputs from 0.5 to 10MHz. Call today for details.

- No missing codes over temperature
- 75dB SNR, -73dB THD @ Nyquist
- Edge triggered; no pipeline delay
- Small 32-pin TDIP; TTL compatible
- 2.9 Watts power dissipation
- MIL-STD-883 screening optional

SPECIFICATIONS	+25°C			0 to +70°C			-55 to +125°C			UNITS
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Sampling Rate	5			5			5			MHz
Integral Nonlinearity		±3/4			±3/4			±1		LSB's
Differential Nonlinearity	-0.95	±0.5	+1.2	-0.95	±0.5	+1.2	-0.95	±0.5	+1.5	LSB's
No Missing Codes	14			14			14			Bits
Total Harmonic Distortion*		-77	-70		-77	-70		-73	-65	dB
Signal-to-Noise Ratio*	73	76		73	76		71	75		dB

* $f_{in} = 1\text{MHz}$

For more details, see pages 1-6, 1-10 and 1-14.

DATEL
INNOVATION and EXCELLENCE

S

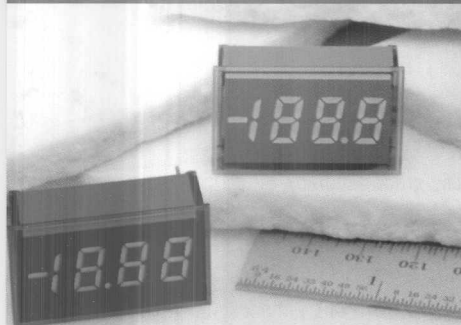
mall size, precision and reliability define DATEL's new line of miniature and subminiature 3½ and 4½ digit voltmeters. Housed in 12-pin, DIP-style, plug-in packages, these new meters all have exceptionally large displays and easily mount into either panels or pc cards. They are fully encapsulated, extremely rugged and able to withstand the harshest environments. They are simply the smallest, most reliable, fully functional, full-display meters available today.

The new meters achieve their small size and outstanding reliability by integrating their display, reference and A/D-converter circuitry into a single assembly. Both LED and LCD models are available. All have built-in bezels, and the LED models incorporate built-in filters.

All meters operate from single +5V or +9V supplies, and all have auto-zero and auto-calibration functions that never require adjustment. DATEL offers a compatible family of application boards that instantly adapt the new meters to a wide variety of common applications, and we're happy to discuss your custom meter requirements.

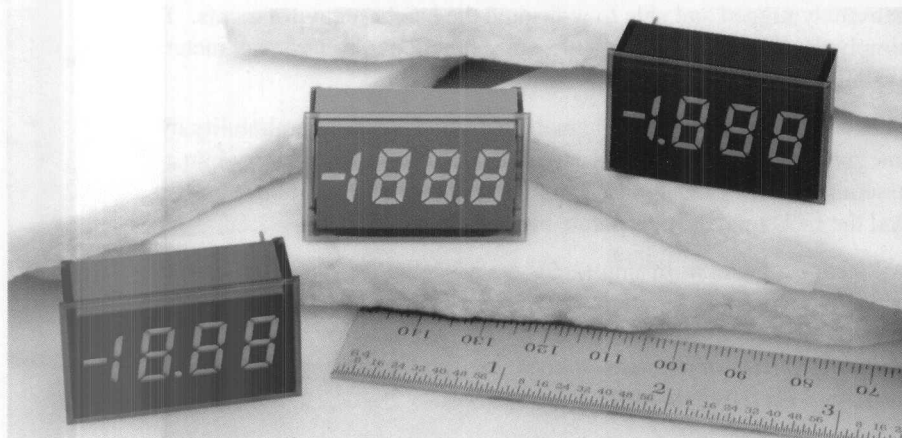
DATEL is redefining the digital panel meter.

Digital Panel Voltmeters and Instruments



New Products	3-2
Product Selection Guides:	
DMS-20 Series Subminiature, 3½ Digit Voltmeters	3-6
DMS-30 Series Miniature, 3½ Digit Voltmeters	3-7
DMS-40 Series Miniature, 4½ Digit Voltmeters	3-8
Plug-In AC Line Monitors	3-9
DM Series Digital Panel Meters	3-10
Application Boards and Accessories	3-11
Voltage Calibrators	3-12

New Products



Subminiature, Low-Cost 3½ Digit, LED Display Digital Panel Voltmeters

DMS-20PC Series

- Subminiature size:
1.38" x 0.88" x 0.48"
35mm x 22mm x 12mm
- Large (0.37"/9.4mm) LED display
- Fully encapsulated, 12-pin DIP package
- 5 LED colors (R/O/A/Y/G)
- High-intensity red LED optional
- 4 differential input voltage ranges
- Selectable decimal point placement
- Single +5V supply
- Auto-polarity changeover
- Auto-calibration, ± 1 count accuracy
- Optional hold feature
- 0°C to +60°C temperature range
- Low cost

See page 3-6.

Low-Power, LED Display 3½ Digit, Subminiature Digital Panel Voltmeters

DMS-20PC-X-RL

- 35mW power consumption
- Single +5V supply (7mA)
- Subminiature size:
1.38" x 0.88" x 0.48"
35mm x 22mm x 12mm
- Large (0.37"/9.4mm) red LED display
- Fully encapsulated, 12-pin DIP package
- 4 differential input voltage ranges
- Selectable decimal point placement
- Auto-calibration, ± 1 count accuracy
- Auto-polarity changeover
- 0°C to +60°C temperature range
- Low cost

See page 3-6.

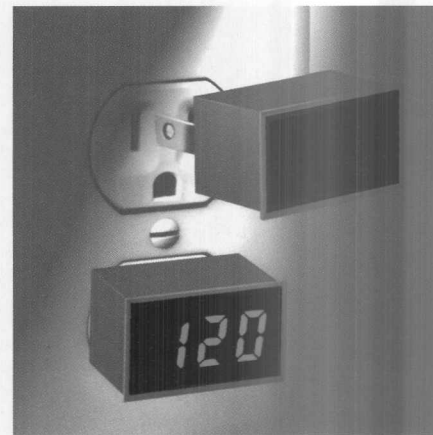
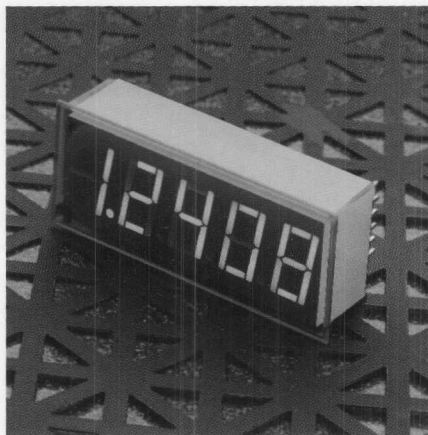
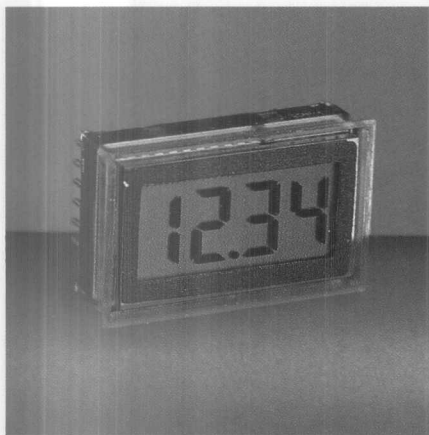
4½ Digit, LCD Display Low-Power, Miniature Digital Panel Voltmeters

DMS-40LCD Series

- Scientific-grade accuracy, ± 2 counts
- Miniature size:
2.17" x 0.93" x 0.43"
55mm x 24mm x 11mm
- Large (0.40"/10.1mm), enhanced-contrast, LCD display
- Backlit models optional
- Single +5V or +9V supply (2.5mA)
- Fully encapsulated, 12-pin DIP package
- 3 differential dual-input voltage ranges
- Selectable decimal point placement
- Low-battery annunciator
- Auto-zero and auto-calibration functions
- 0°C to +50°C temperature range
- Low cost

See page 3-8.

New Products



Lowest-Cost, 3½ Digit LCD Display, Sub-Miniature Digital Panel Voltmeters

DMS-20LCD Series

- Subminiature size:
1.38" x 0.88" x 0.43"
35mm x 22mm x 11mm
- Large (0.37"/9.4mm), enhanced-contrast, LCD display
- Fully encapsulated, 12-pin DIP package
- Backlit models optional
- Single +5V supply (400µA)
- Single +9V supply (200µA)
- Low-battery annunciator
- 4 differential input voltage ranges
- Selectable decimal point placement
- Auto-zero and auto-polarity changeover
- 0°C to +60°C temperature range
- Low cost

See page 3-6.

4½ Digit, Miniature LED Display Digital Panel Voltmeters

DMS-40PC Series

- Miniature size:
2.17" x 0.93" x 0.56"
55mm x 24mm x 14mm
- Large (0.52"/13.2mm) LED display
- Optional red, green or yellow LED colors
- Optional high-intensity displays
- Fully encapsulated, 12-pin DIP package
- 3 differential input voltage ranges
- Selectable decimal point placement
- Single +5V supply
- Auto-calibration, ±2 counts accuracy
- Hold and test functions
- Optional BCD outputs
- 0°C to +50°C temperature range
- Low cost

See page 3-8.

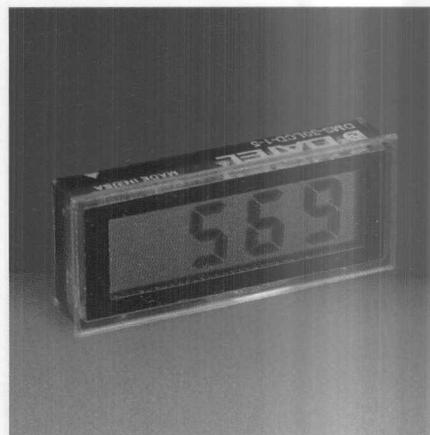
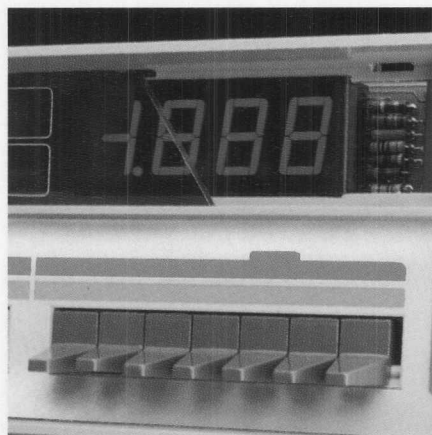
AC Line Monitor Low-Cost, "Plug-In" Self Powered

DMS-20PC-1-LM

- The lowest cost digital ac voltmeter anywhere
- Plugs directly into wall outlet
- UL and CSA certified
- Large, east-to-read display
- 85-264Vac, 47-63Hz operation
- Half-wave averaging, RMS calibrated
- Fully encapsulated for any environment
- Screw terminals for panel mounting
- Subminiature size

See page 3-9.

New Products



3 1/2 Digit, Miniature LED Display Digital Panel Voltmeters

DMS-30PC Series

- Miniature size:
2.17" x 0.93" x 0.56"
55mm x 24mm x 14mm
- Large (0.56"/14.2mm) LED display
- Fully encapsulated, 12-pin DIP package
- 7 LED colors, standard or high intensities
- 3 differential input voltage ranges
- Selectable decimal point placement
- Single +5V supply
- Auto-calibration, ± 1 count accuracy
- 0°C to +60°C temperature range
- Numerous application boards available
- Low cost

See page 3-7.

Low-Power, LED 3 1/2 Digit, Miniature Digital Panel Voltmeters

DMS-30PC-X-RL

- Single +5V supply (10mA)
- 50mW power consumption
- Miniature size:
2.17" x 0.93" x 0.56"
55mm x 24mm x 14mm
- Large (0.56"/14.2mm) LED display
- Optional red, orange or green LED colors
- Fully encapsulated, 12-pin DIP package
- 3 differential input voltage ranges
- Selectable decimal point placement
- Auto-calibration, ± 1 count accuracy
- 0°C to +60°C temperature range
- Numerous application boards available
- Low cost

See page 3-7.

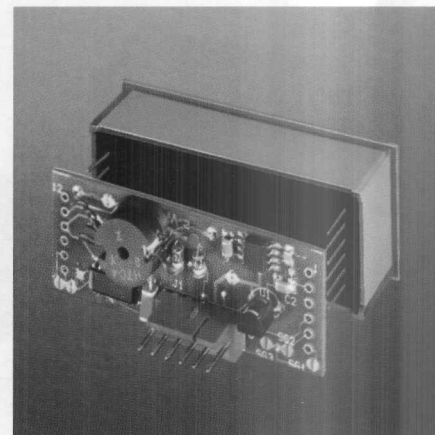
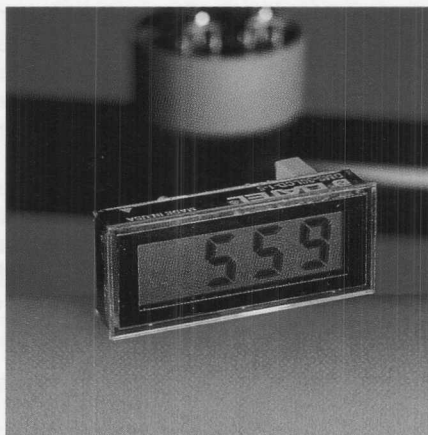
LCD Display 3 1/2 Digit, Miniature Digital Panel Voltmeters

DMS-30LCD Series

- Miniature size:
2.17" x 0.93" x 0.43"
55mm x 24mm x 11mm
- Large (0.40"/10.2mm), enhanced-contrast, LCD display
- Backlit models optional
- Fully encapsulated, 12-pin DIP package
- 3 differential input voltage ranges
- Selectable decimal point placement
- Single +5V or +9V supply
- Auto-calibration, ± 1 count accuracy
- 0°C to +60°C temperature range
- Numerous application boards available
- Low cost

See page 3-7.

New Products



Low-Power, LED 4½ Digit, Miniature Digital Panel Voltmeters

DMS-40PC-X -RL

- Single +5V supply (35mA, 175mW)
- Large (0.52"/13.2mm) red LED display
- Miniature size:
2.17" x 0.93" x 0.56"
55mm x 24mm x 14mm
- Fully encapsulated, 12-pin DIP package
- 3 differential input voltage ranges
- Selectable decimal point placement
- Auto-calibration, ± 1 count accuracy
- Auto-polarity changeover
- Hold and test functions
- 0°C to +50°C temperature range
- Low cost

See page 3-8.

4-20mA, Loop-Powered 3½ Digit, LCD Display Process Monitor

DMS-30LCD-4/20S

- Requires no external power
- Inputs connect directly to loop source
- Gain and offset adjustments
- $\pm 0.05\%$ (± 1 count) accuracy
- 0°C to +60°C temperature range
- Small size:
2.17" x 0.93" x 0.52"
55mm x 24mm x 13mm
- Large (0.40"/10.2mm), enhanced-contrast LCD display
- Screw type input terminals
- Provisions for custom input ranges
- Low cost

Contact DATEL

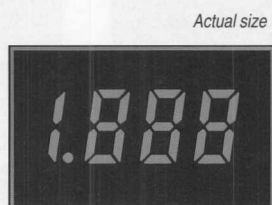
Application Boards for 3½ Digit, Miniature Digital Panel Voltmeters

DMS-EB Series

- Flexible, low-cost solutions for real world applications
- Install directly on DMS-30 Series meters
- Do not interfere with panel cutouts
- RMS-to-dc conversion
- J and K-type thermocouple interface
- 4-to-20mA process monitoring
- Solid state temperature probe interface
- 90-to-260Vac primary power
- Isolated (750V) +5V primary power
- Bezels, cutout punches
- Low cost

See page 3-11.

3½ Digit, LED and LCD Subminiature Digital Panel Voltmeters



- Large (0.37"/9.4mm) LED or LCD display
- Low power LED models (<7mA)
- 12-pin DIP, panel or board mountable
- Hold feature (LED models)
- 4 standard input ranges: $\pm 200\text{mV}$, $\pm 2\text{V}$, $\pm 20\text{V}$, $\pm 200\text{V}$
- Built-in filter/bezel
- $\pm 0.05\%$ Accuracy (± 1 count)
- Moisture and vibration resistant encapsulated package
- Backlit LCD models available
- Single +5V supply for LED models
- Single +5V or +9V supply for LCD models
- Lowest cost

[illegible]

Accuracy:	$\pm 200\text{mV}$, $\pm 2\text{V}$ models	± 1 Count
	$\pm 20\text{V}$, $\pm 200\text{V}$ models	± 2 Counts
Zero Reading ($V_{\text{IN}} = 0\text{V}$)		000
Temperature Drift of Gain		± 0.2 Counts/ $^{\circ}\text{C}$
Polarity Indication		Autopolarity
Overrange Indication		-1--- (for $-V_{\text{IN}}$), 1--- (for $+V_{\text{IN}}$)

Full Scale Input	See ordering guide
Input Impedance:	
±200mV, ±2V models	1000MΩ
±20V, ±200V models	1.0MΩ
Overvoltage Protection (max)	±250V (LED)

Display Height	0.37"/9.4mm
Operating Temperature	0 to +60°C
Storage Temperature	-40 to +75°C (LED) -20 to +75°C (LCD)
Humidity	0 to 95% non-condensing

DMS-20PC-X-RS	5Vdc, 60mA	DMS-20PC-X-OS	5Vdc, 90mA
DMS-20PC-X-RL	5Vdc, 7mA	DMS-20PC-X-Y5	5Vdc, 90mA
DMS-20PC-X-RS-H	5Vdc, 60mA	DMS-20LCD-X-S	5Vdc, 400µA
DMS-20PC-X-RH	5Vdc, 60mA	DMS-20LCD-X-9	9Vdc, 230mA
DMS-20PC-X-AS	5Vdc, 90mA	DMS-20LCD-X-5B	5Vdc, 35mA
DMS-20PC-X-GS	5Vdc, 90mA	DMS-20LCD-X-9B	9Vdc, 35mA

DMS-EB2	Multipurpose application board (4-20mA, gain/offset adjust)
DMS-20-CP	Panel cutout punch
DMS-BZL3	DMS-20PC bezel
DMS-BZL4	DMS-20PC bezel with sealing gasket

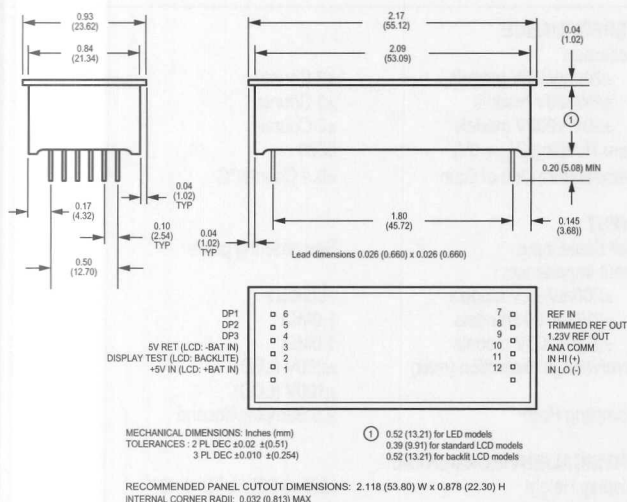
DMS-30 Series

3½ Digit, LED and LCD Minature Digital Panel Voltmeters



- 0.56 in. (14.2mm) high LED, 0.40 in. (10.2mm) high LCD
- Low power LED models (10 mA)
- 12-pin DIP, panel or board mountable
- LED and LCD models are pin-compatible
- 3 standard input ranges: $\pm 200\text{mV}$, $\pm 2\text{V}$, $\pm 20\text{V}$
- Built-in filter/bezel
- $\pm 0.05\%$ Accuracy (± 1 count)
- Moisture and vibration resistant encapsulated package
- Backlit LCD models available
- Single +5V supply for LED models
- Single +5V or +9V supply for LCD models
- Numerous application boards available
- Low cost

MECHANICAL



SPECIFICATIONS Typical @ +25°C and +5V supply unless noted

PERFORMANCE

Accuracy:	
$\pm 200\text{mV}$, $\pm 2\text{V}$ models	± 1 Count
$\pm 20\text{V}$ model	± 2 Counts
Zero Reading ($V_{IN} = 0\text{V}$)	000
Temperature Drift of Gain	± 0.2 Counts/ $^{\circ}\text{C}$
Polarity Indication	Autopolarity
Overrange Indication	-1--- (for $-V_{IN}$), 1--- (for $+V_{IN}$)

INPUT

Full Scale Input	See ordering guide
Input Impedance:	
$\pm 200\text{mV}$, $\pm 2\text{V}$ models	1000M Ω
$\pm 20\text{V}$ model	1.0M Ω
Overvoltage Protection (max)	$\pm 250\text{V}$ (LED) $\pm 100\text{V}$ (LCD)

Sampling Rate

2.5 Samples/second

PHYSICAL/ENVIRONMENTAL

Display Height	LED: 0.56" / LCD: 0.40"
Operating Temperature	0 to +60 $^{\circ}\text{C}$
Storage Temperature	-40 to +75 $^{\circ}\text{C}$ (LED) -20 to +75 $^{\circ}\text{C}$ (LCD)
Humidity	0 to 95% non-condensing

POWER REQUIREMENTS

DMS-30PC-X-RS	5Vdc, 150mA	DMS-30PC-X-GL	5Vdc, 60mA
DMS-30PC-X-RL	5Vdc, 10mA	DMS-30PC-X-OL	5Vdc, 60mA
DMS-30PC-X-RH	5Vdc, 150mA	DMS-30PC-X-BS	5Vdc, 400mA
DMS-30PC-X-AS	5Vdc, 150mA	DMS-30LCD-X-5	5Vdc, 800 μA
DMS-30PC-X-GS	5Vdc, 150mA	DMS-30LCD-X-9	9Vdc, 350 μA
DMS-30PC-X-OS	5Vdc, 150mA	DMS-30LCD-X-5B	5Vdc, 35mA
DMS-30PC-X-YS	5Vdc, 150mA	DMS-30LCD-X-9B	9Vdc, 35mA
DMS-30PC-X-QS	5Vdc, 150mA		

ORDERING GUIDE

DMS-30PC - 1 - R S

LED Model

Input Range

0 $\pm 200\text{mV}$

1 $\pm 2\text{V}$

2 $\pm 20\text{V}$

LED Color

Y Yellow

O Orange

A Amber

R Red

G Green

B Blue

Q Aqua

Power/Intensity

S Standard

H High Intensity (Red LED only)

L Low Power

(Red, orange, and green

LED's only)

DMS-30LCD - 1 - 5 B

LCD Model

Input Range

0 $\pm 200\text{mV}$

1 $\pm 2\text{V}$

2 $\pm 20\text{V}$

Add B for Backlit

Power Supply

5 5Vdc

9 9 to 12V Battery

ACCESSORIES

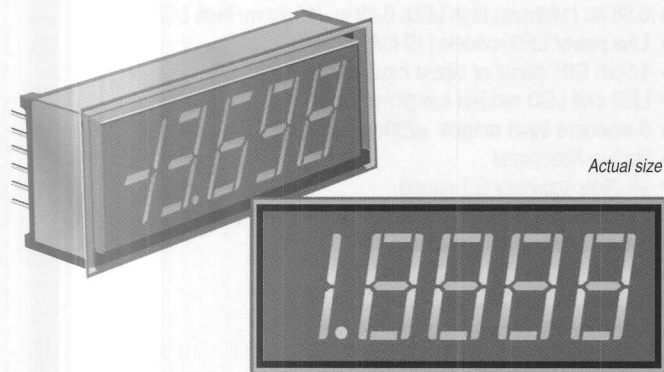
RN-DMS	Gain /offset potentiometer kit for DMS-EB
DMS-30-CP	Panel cutout punch
DMS-BZL1	DMS-30 bezel assembly
DMS-BZL2	DMS-30 bezel assembly with sealing gasket

ADD-ON APPLICATION BOARDS

DMS-EB	Multipurpose (4-20mA, gain/offset adjust)
DMS-EB-HTB	Accurate temperature probe sensing for 200mV models
DMS-EB-DC/DC	Provides isolated +5V power
DMS-EB-TCJ	J-type thermocouple inputs for $\pm 2\text{V}$ models
DMS-EB-TCK	K-type thermocouple inputs for $\pm 2\text{V}$ models
DMS-EB-RMS	For true RMS measurements of AC voltages
DMS-EB-AC/DC	For AC line-powered applications
DMS-EB-LP	For 4-20mA loop-powered applications

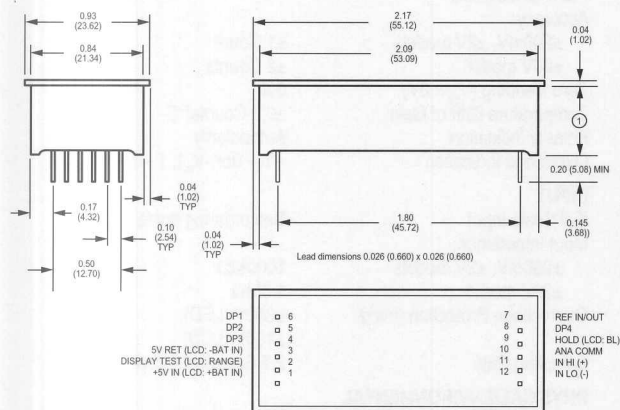
DMS-40 Series

4½ Digit, LED and LCD
Minutaire Digital Panel Voltmeters



- Scientific-grade accuracy, ± 2 counts
- 0.52 in. (13.2mm) high LED, 0.40 in. (10.2mm) high LCD
- Low power LED models (35 mA)
- 12-pin DIP, panel or board mountable
- Hold feature standard
- 4 standard input ranges: ± 200 mV, ± 2 V, ± 20 V, ± 200 V
- LCD models are dual input range
- Built-in filter/bezel
- Moisture and vibration resistant encapsulated package
- Backlit LCD models available
- Single +5V supply for LED models
- Single +5V or +9V supply for LCD models
- Low cost

MECHANICAL



BCD MODELS:
Consult DATEI
for detailed mechanical
specifications

MECHANICAL DIMENSIONS: inches (mm)
TOLERANCES: 2 PL DEC ± 0.02 $\pm (0.51)$
3 PL DEC ± 0.010 $\pm (0.254)$
① 0.52 (13.21) for LED models
0.39 (9.91) for standard LCD models
0.52 (13.21) for backlit LCD models

RECOMMENDED PANEL CUTOUT DIMENSIONS: 2.118 (53.80) W x 0.878 (22.30) H
INTERNAL CORNER RADIUS: 0.032 (0.813) MAX

SPECIFICATIONS Typical @ +25°C and +5V supply unless noted

PERFORMANCE

Accuracy:	
± 200 mV/ ± 2 V models	± 2 Counts
± 2 V/ ± 20 V models	± 3 Counts
± 20 V/ ± 200 V models	± 3 Counts
Zero Reading ($V_{IN} = 0$ V)	0000
Temperature Drift of Gain	± 0.4 Counts/ $^{\circ}$ C

INPUT

Full Scale Input	See ordering guide
Input Impedance:	
± 200 mV/ ± 2 V models	1000M Ω
± 2 V/ ± 20 Vdc models	1.0M Ω
± 20 V/ ± 200 V models	1.0M Ω
Overtoltage Protection (max)	± 250 V (LED) ± 100 V (LCD)
Sampling Rate	2.5 Samples/second

PHYSICAL/ENVIRONMENTAL

Display Height	LED: 0.52" / LCD: 0.40"
Polarity Indication	Autopolarity
Overrange Indication:	
LED models	-0000 (flashing for $-V_{IN}$)
LED models	0000 (flashing for $+V_{IN}$)
LCD models	-1---- (for $-V_{IN}$)
LCD models	1---- (for $+V_{IN}$)
Operating Temperature	0 to +50°C
Storage Temperature	-20 to +75°C
Humidity	0 to 95% non-condensing

POWER REQUIREMENTS

DMS-40PC-X-RS	5Vdc, 100mA	DMS-40PC-X-YS	5Vdc, 100mA
DMS-40PC-X-RL	5Vdc, 35mA	DMS-40LCD-X/X-5	5Vdc, 2.5mA
DMS-40PC-X-RS-BCD	5Vdc, 100mA	DMS-40LCD-X/X-9	9Vdc, 1.5mA
DMS-40PC-X-RH	5Vdc, 100mA	DMS-40LCD-X/X-5B	5Vdc, 35mA
DMS-40PC-X-GS	5Vdc, 100mA	DMS-40LCD-X/X-9B	9Vdc, 35mA
DMS-40PC-X-OS	5Vdc, 100mA		

ORDERING GUIDE

DMS-40PC - 1 - R S - BCD

LED Model

Input Range

- 1 ± 2 V
- 2 ± 20 V
- 3 ± 200 V

LED Color

- Y Yellow
- R Red
- G Green

Power/Intensity

- S Standard
- H High Intensity
- L Low Power

(Red LED only)

Optional BCD output
(Red LED, standard model only)

DMS-40LCD - 0/1 - 5 B

LCD Model

Input Range

- 0/1 ± 200 mV/ ± 2 V
- 1/2 ± 2 V/ ± 20 V
- 2/3 ± 20 V/ ± 200 V

Power Supply

- 5 5Vdc
- 9 9 to 12V Battery

Add B for Backlit

ACCESSORIES

DMS-30CP	Panel cutout punch
DMS-BZL1	DMS-40 bezel
DMS-BZL2	DMS-40 bezel with sealing gasket
DMS-EB	Multipurpose board (4-20mA, gain/offset adjust)

AC Line Monitor DMS-20PC-1-LM

Miniature, 3-Digit LED, Self-Powered

- Plugs directly into wall outlet
- Screw terminals for panel mounting
- Subminiature size
- Large, easy-to-read display
- Fully encapsulated for HARSH environments
- 85 to 264Vac operation (47-63Hz)
- Half-wave averaging, rms calibrated
- UL, CSA, and IEC1010-1 certified
- Very low cost

FUNCTIONAL SPECIFICATIONS

INPUT

Overvoltage Protection	300Vrms (Overvoltage category II)
Voltage Range	85 - 264Vrms
Frequency Range	47 - 63Hz
Power Consumption	0.05A (max.)

PERFORMANCE

Sampling Rate	2.5 Samples/second
Measurement Type	Half-wave averaging rms calibrated for sinusoidal input
Accuracy @ 25°C	±1V (typ.), ±2V (max.)
Temperature Drift	(-25°C to +60°C) ±0.15 Volts/°C (max.)

PHYSICAL

Dimensions	0.88" x 1.38" x 1.00"
Display	3 digit LED, 0.37" H
Weight	1.0 oz. (28 grams)
Case Material	Polycarbonate

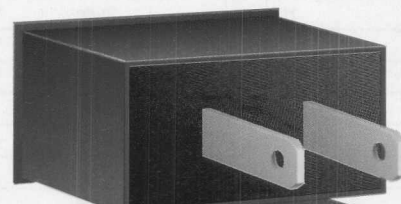
ENVIRONMENTAL

Operating Temperature	-25°C to +60°C
Storage Temperature	-40°C to +75°C
Humidity	0 to 95% rh (non-condensing)

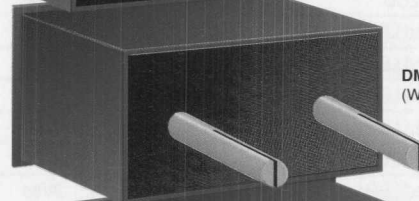
DATEL's DMS-20PC-1-LM is a component-size, self-contained, low-cost ac voltmeter for true line measurements. It requires no additional components or auxiliary power. Simply plug it into any wall outlet and instantly read line voltages from 85 to 264 Vac (47-63Hz). The large (0.37") bright red LED display is a DATEL exclusive, making the DMS-20PC-1-LM easily readable in virtually any lighting condition.

DMS-20PC-1-LM employs half-wave sinusoidal averaging techniques (rms calibrated) and has a display resolution of 1Vac over the full range input span of the meter. Packaged in a red filter case with integrated bezel, the DMS-20PC-1-LM is fully encapsulated for ruggedness. Reliable, trouble-free operation is assured with low parts count and SMT assembly. All units are overvoltage protected to 300Vac. Operating temperature range is a wide -25°C to +60°C.

This low-cost, plug-in meter is ideal for industrial, laboratory, office, and field-service applications. Its miniature size is perfect for design into high-end consumer electronics, laboratory instrumentation, and other products requiring accurate ac line monitoring.

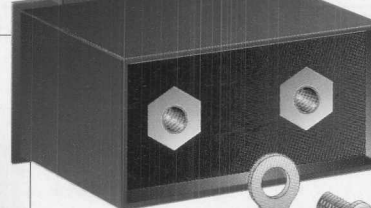


DMS-20PC-1-LM-F
(With blade terminals)



DMS-20PC-1-LM-R
(With round terminals)

Other NEMA configurations available on request



DMS-20PC-1-LM
(Panel Mounting)

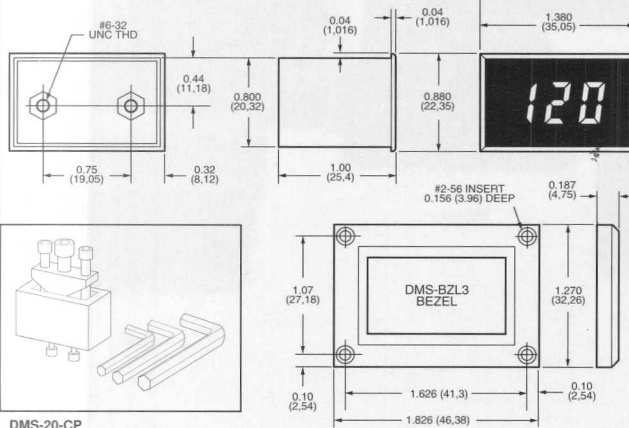
Suggested wiring
(User supplied)

Recommended Screws:
Panel mount 0.25 inch, 6-32 brass
PC mount 0.50 inch, 6-32 brass

MECHANICAL

RECOMMENDED PANEL CUTOUT DIMENSIONS:
1.336 (33.93) W x 0.838 (21.28) H
INTERNAL CORNER RADIUS:
0.062 (1.57) MAX.

DIMENSIONS IN INCHES (MILLIMETERS)



Made in U.S.A.

ORDERING GUIDE

DMS-20PC-1-LM	With threaded terminations and screws
DMS-20PC-1-LM-F	With blade terminals, factory installed
DMS-20PC-1-LM-R	With round terminals, factory installed
DMS-20-CP	Panel cutout punch
DMS-BZL3	Panel mount bezel
DMS-BZL4	Panel mount bezel, with sealing gasket

Retaining Clip supplied with all models.

DM Series

Digital Panel Voltmeters

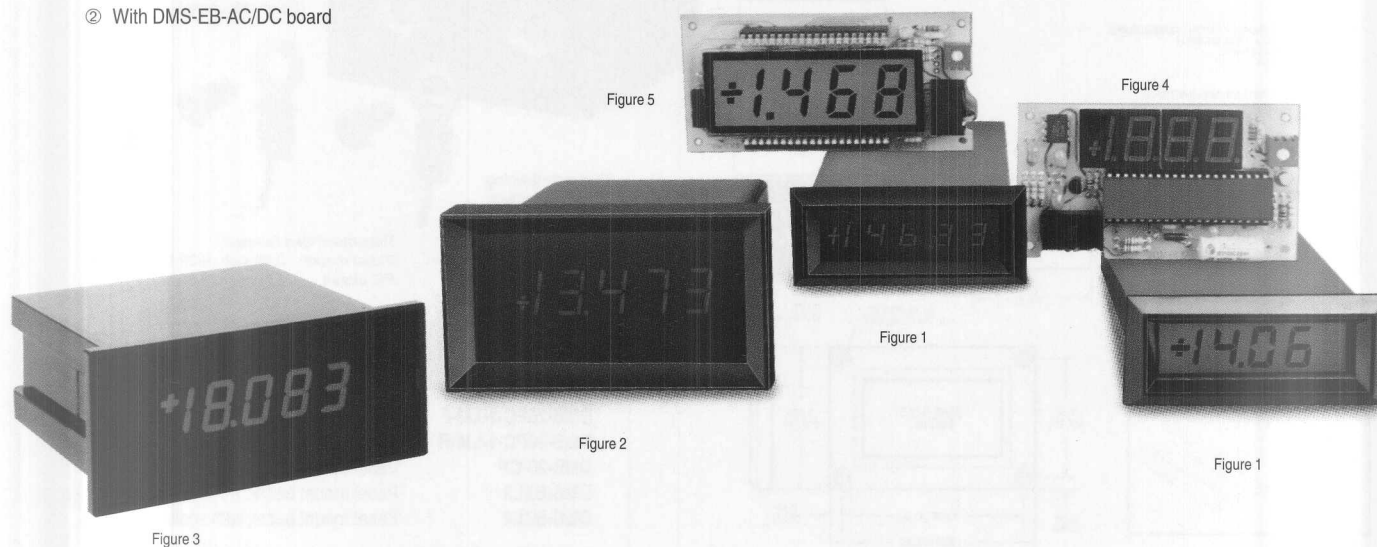
While DATEL highly recommends using our new DMS Family of panel meters for all new design-in projects, we continue to supply many of our older DPM products including those listed below. They feature:

- 3½ and 4½ digit resolutions
- LCD or LED displays
- High-impedance differential inputs
- Auto-zero and auto-polarity changeover
- High-stability reference circuits
- +5Vdc or 115/230Vac power
- Traditional case sizes:
1/8 DIN, low profile, shallow depth
- Free connectors

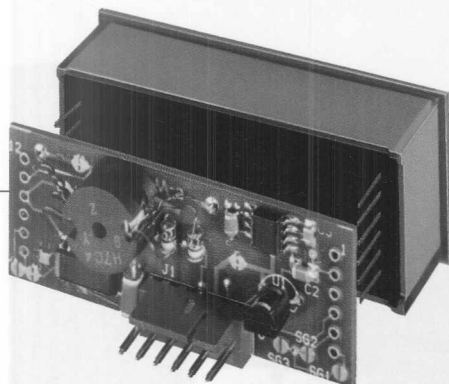
	Model	Display Height and Type	Power Source	Input Range	Display Hold	4-20mA Capability	BCD Outputs	Case	Recommended Replacement
3.5 Digit	DM-3100L	0.56" Red LED	5Vdc	2Vdc	--	--	--	Fig.2	DMS-30PC-1-RS
	DM-3100N	0.56" Red LED	5Vdc	2Vdc	--	Yes	--	Fig. 1	DMS-30PC-1-RS
	DM-3101	0.60" Red LED hi intensity	5Vdc	2Vdc	--	Yes	--	Fig. 1	DMS-30PC-1-RS
	DM-3103	0.56" Red LED hi intensity	5Vdc	2Vdc	--	--	--	Fig. 2	DMS-30PC-1-RS
	DM-3100B	0.56" Red LED	115/230Vac	2Vdc	--	--	--	Fig. 2	DMS-30PC-1-RL ②
	DM-3104	0.60" Red LED	115/230Vac	2Vdc	--	--	--	Fig. 2	DMS-30PC-1-RL ②
	DM-9115	0.56" Red LED	115/230Vac	2Vdc	Yes	--	--	Fig. 3	DMS-30PC-1-RL ②
	DM-31	0.56" Red LED	5Vdc	2Vdc	Yes	--	--	Fig. 4	DMS-20PC-1-RS
	DM-3102A	0.50" LCD ①	5Vdc	Auto range	Yes	--	Yes	Fig. 1	--
	DM-3100U1	0.50" LCD ①	5V or 9-15Vdc	2Vdc	--	Yes	--	Fig. 1	--
	DM-3100U2	0.50" LCD ①	9-15Vdc or 115Vac	2Vdc	--	Yes	--	Fig. 1	--
	DM-3100X	0.50" LCD	5V or 9-15Vdc	2Vdc	--	--	--	Fig. 2	DMS-30LCD-1-5
	DM-LX3	0.75" LCD	3.5-7Vdc	2Vdc	Yes	--	--	Fig. 5	DMS-30LCD-1-5
4.5 Digit	DM-4101N	0.30" Red LED	5Vdc	2Vdc	Yes	--	--	Fig. 1	DMS-40PC-1-RS
	DM-4100D	0.30" Red LED	5Vdc	2Vdc	Yes	--	Yes	Fig. 1	DMS-40PC-1-RS
	DM-4200	0.30" Red LED	5Vdc	2Vdc	Yes	--	Yes	Fig. 1	DMS-40PC-1-RS
	DM-9200	0.56" Red LED	5Vdc	2Vdc	Yes	--	--	Fig. 3	DMS-40PC-1-RS
	DM-4101L	0.56" Red LED	5Vdc	2Vdc	Yes	--	Yes	Fig. 2	DMS-40PC-1-RS
	DM-9215	0.56" Red LED	115/230Vac	2Vdc	Yes	--	--	Fig. 3	--
	DM-4105	0.50" LCD	5-6Vdc	2Vdc	Yes	--	Yes	Fig. 1	DMS-40LCD-0/1-5

① With display annunciator

② With DMS-EB-AC/DC board



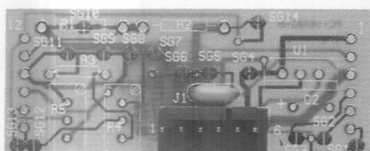
DMS Series Accessories



A wide selection of application-specific add-on boards, bezel assemblies and panel cutout punches are available for DATEL's new DMS Series Digital Panel Voltmeters.

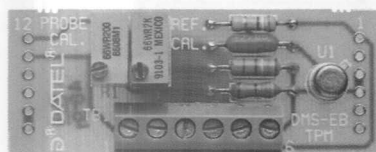
The DMS-EB Series of application boards provide a flexible, low-cost solution to interfacing DMS Series Digital Panel Voltmeters to many common real-world applications. These application boards are designed to mount directly on the back of the meters. The boards feature convenient input/output terminals, solder gaps for implementing various functions, and potentiometers for performing various adjustments.

Originally designed for use with DMS-30 Series (miniature 3½ digit) meters, many of the application boards also work with DMS-40 Series (miniature 4½ digit) meters. Contact one of DATEL's Application Engineers for more information.



DMS-EB - Multipurpose application board has provisions for:

- Gain and zero offset adjust potentiometers
- 4-20mA current loop input
- Input voltage dividers
- Current measurements



DMS-EB-HTB - High accuracy temperature probe board

- Uses solid state probe (AD590)
- -50 to +150°C, -50 to +199.9°F
- Use with ±200mV meters

DMS-EB-AC/DC - For AC line powered board

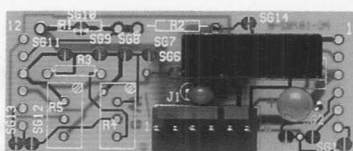
- 120Vac and 220Vac 50/60Hz models
- 750V isolation (1500V special order)
- Powers 5V LCD and red low-power LED
- Includes all features of DMS-EB
- Low cost

DMS-BZL1 DMS-30/DMS-40 Bezel Assembly

DMS-BZL2 DMS-30/DMS-40 Bezel Assembly with sealing gasket

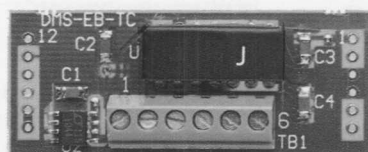
DMS-BZL3 DMS-20 Bezel Assembly

DMS-BZL4 DMS-20 Bezel Assembly with sealing gasket



DMS-EB-DC/DC - Provides isolated 5Vdc power

- 750V minimum isolation
- Includes all features of DMS-EB
- Use on all 5V meters (except blue LED)
- Low cost

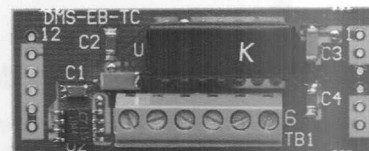


DMS-EB-TCJ - Thermocouple board for thermometer applications

- J thermocouple input
- -100 to +200°C capability
- Low cost - use with ±2V meters

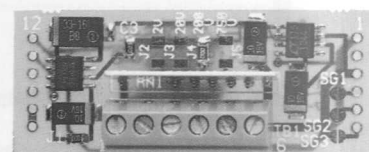
DMS-EB-LP - 4-20mA loop powered board

- Loop powered, no external power required
- Includes gain and zero offset adjustments
- Use with 5V LCD meters (un-backlit models)



DMS-EB-TCK - Thermocouple board for thermometer applications

- K thermocouple input
- -100 to +200°C capability
- Low cost - use with ±2V meters

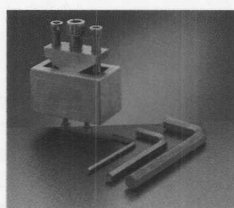


DMS-EB-RMS - For true RMS measurements of AC voltages

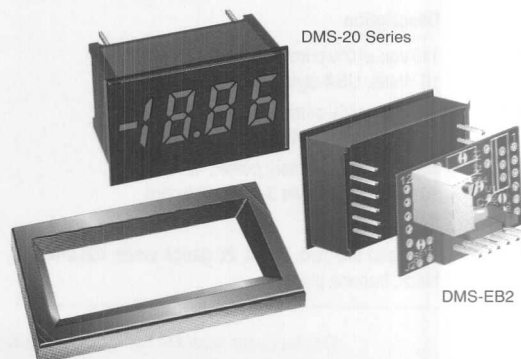
- 0-200Vac input, use with ±200mV meters
- 0-1000Vac input, use with ±2V meters

RN-DMS - Potentiometer accessories

- 2 potentiometers for gain/offset adjust
- Use with: DMS-EB; DMS-EB-AC/DC; DMS-EB-DC/DC



DMS-30-CP, DMS-20-CP Panel cutout punch



Voltage Calibrators

DVC-8500/DVC-350A

DATEL's DVC-8500 and DVC-350A DC Voltage Calibrators deliver performance that exceeds other calibrators costing 2 to 3 times as much. The DVC-8500 is the voltage standard we use in the calibration and testing of our own DMS and DM Series digital panel voltmeters. It is a standard you can use to test any panel meter or A/D converter.



DVC-8500 Precision Voltage Standard

- ± 19.999 Volts output in 1mV increments (0.005% "setability")
- ± 1.5 mV fine vernier adjustment excellent for "tweaking"
- Oven-stabilized zener reference
- 25mA output current
- Easy-to-use, quick select, "lever" switches
- Polarity-reversing lever switch eliminates need to switch output leads
- Shielded metal case for bench or panel mounting
- Outputs available at front or rear of unit

Selected Specifications

Output voltage range	0 to ± 19.999 V in 1mV steps
Output current range	0 to 25mA
Output overload	>25mA activates front-panel LED
Output impedance	<10 milliohms
Capacitive load	No limitations
Output noise	25 μ Vp-p (no capacitive loading)
Accuracy @ +25°C	± 25 ppm of setting
Temperature drift	± 4 ppm of setting/°C
Operating temp. range	0°C to +50°C
Case size	5.59"W x 2.11"H x 5.78"D 142mm x 54mm x 147mm
Weight	2.25 pounds/1 kgram

Ordering Guide

Model	Description
DVC-8500A	115Vac $\pm 10\%$ primary power, 47-440Hz, 10 Watts, USA-style 3-prong line cord
DVC-8500E	230Vac $\pm 10\%$ primary power, 47-440Hz, 10 Watts, USA-style 3-prong line cord
DVC-8500J	100Vac $\pm 10\%$ primary power, 47-440Hz, 10 Watts, USA-style 3-prong line cord
P/N 38-8193022	Panel mount kit
P/N 38-8193902	Test lead set (two, 3-foot, 20 gauge leads, red and black, banana plugs)

DVC-350A Hand-Held Voltage Calibrator

- Direct decimal or hexadecimal inputs
- Two output voltage ranges: Decimal: ± 12 V or ± 1.2 V
Hex: ± 10 V or ± 1 V
- Requires single 9V battery (rechargeable battery optional)
- 4½ digit LCD display with "low battery" indicator
- $\pm 0.01\%$ accuracy
- Cursor control provides up-down output adjust
- Light-weight (11oz./312g) plastic case

Selected Specifications

Output voltage ranges:	0 to ± 12 V, 1mV increments 0 to ± 1.2 V, 100 μ V increments 0 to ± 10 V, 2.44mV increments 0 to ± 1 V, 244 μ V increments
Output current range	0 to 20mA
Output overload:	Overload indicator at >20mA Automatic shutdown at 33mA
Output impedance	<30 milliohms
Capacitive load	No limitations
Output noise	150 μ Vp-p (no capacitive loading)
Accuracy @ +25°C	$\pm 0.015\%$ of full scale
Temperature drift	± 10 ppm of setting/°C
Operating temp. range	0°C to +50°C
Case size	5.75"H x 3.6"W x 1.29"D 146mm x 91mm x 33mm
Weight	11 ounces/312 grams

Ordering Guide

Model	Description
DVC-350A	Calibrator, water resistant carrying case, two 3-foot test leads (20 gauge), certificate of calibration, operation manual
P/N 39-7267690	Accessory kit includes 7.2V Ni-Cd battery and ac adapter/charger (UL/CSA approved)

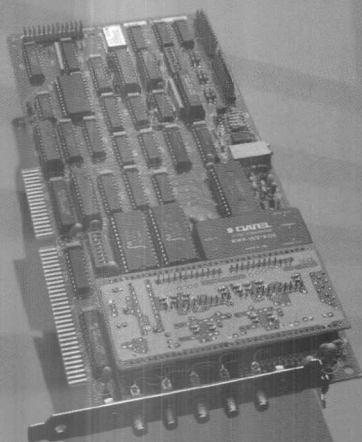
Contact your local DATEL sales office for data sheets on products listed in this catalog.

25

years of responding to our customers most demanding requirements has given DATEL a line of high-performance, analog-signal-processing boards for PC/AT and EISA buses that are truly unique. Our analog I/O boards offer unmatched combinations of resolution, throughput and dynamic range. Unique input configurations include 8 parallel channels of high-speed, 12-bit, simultaneous sampling. Clever architectures exploit on-board DSP coprocessors, FIFO's and dual-port RAM's to permit high-speed (often beyond the bus limit), nonstop, continuous streaming of preprocessed data to memory or disk ... with no lost samples. Other distinctive boards function as arbitrary waveform generators and programmable power supplies. Our products are different.

We're different. We offer patient, experienced application support, and we're more than happy to invest time discussing your individual requirement so that you may achieve an optimal solution.

All of our board products are manufactured by DATEL, in the U.S.A., under the strictest quality controls. All boards are power-cycle burned in and are covered by a full one-year warranty.

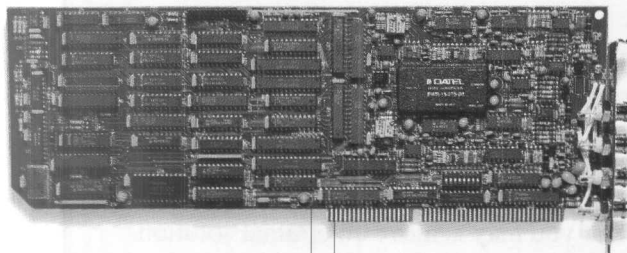


Analog Boards for PC/AT and EISA Buses

Turn Your PC into an ATE or Signal Processing Lab	4-2
New Products	4-3
Feature Products:	
PC-430 Analog Input plus DSP Coprocessor	4-6
PC-415 High-Speed Analog Input Board for EISA Bus	4-7
PC-420 Arbitrary Waveform Generator Board	4-8
PC-462 Quad-Output Programmable Power Supply Board ..	4-9
Product Selection Guides - Hardware/Software	4-10
Product Selection Guides - Software/New Products	4-12

DATEL turns your PC into a powerful, low-cost ATE or Signal Processing Lab

PC-420 Arbitrary Signal Generator



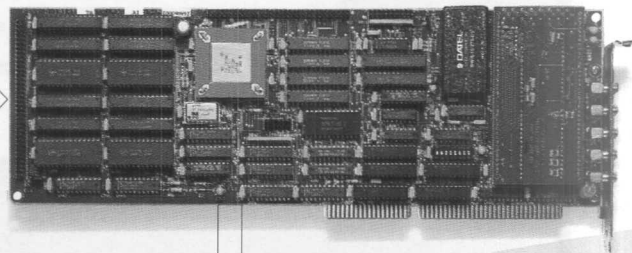
PC-420
"SET"
WINDOWS®
Software



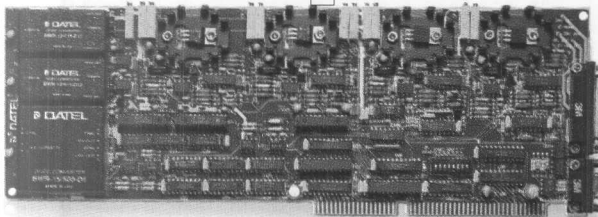
Test
Signal
Files

YOUR LINEAR
CIRCUIT
UNDER TEST

PC-411, 412, 414 or 430 Analog Boards



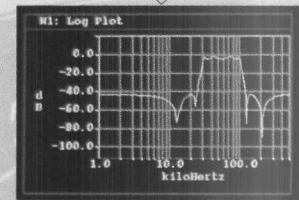
PC-462
Programmable
Power Supply



PC-462 "SET"
WINDOWS® Software

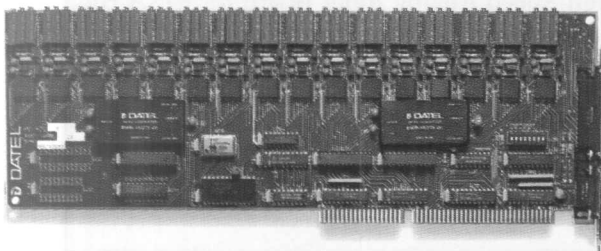
"SET"
Software

Signal
Files

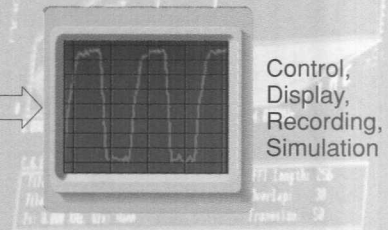


Spectrum Analyzer

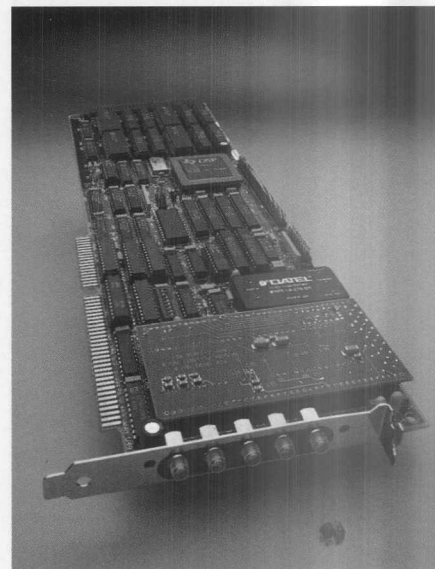
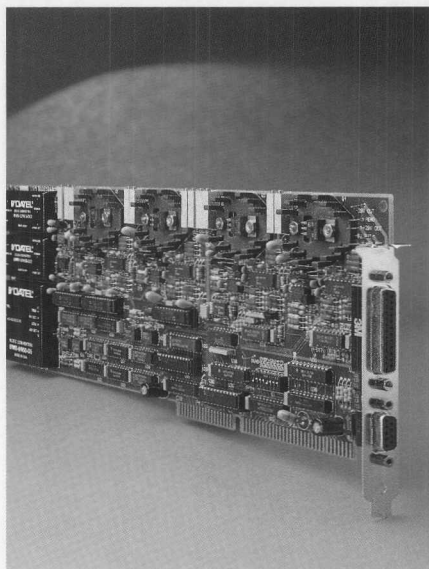
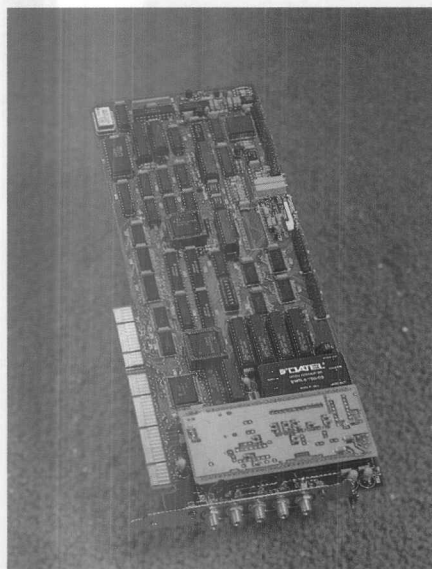
PC-422 16-Channel Output Board



"SET"
Software



New Products



10MHz, 12-14 Bit Analog Input Boards for EISA Computers

PC-415 Family

- The ideal array-processor "front end"
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- Wideband inputs with low harmonic distortion
- Quick, 32-bit, EISA block transfers
- 2/4/8-channel simultaneous sampling eliminates phase skew
- On-board A/D FIFO memory to 8k samples
- 32 megasample or greater data streaming
- Pre/post-trigger, gap-free, ring buffering
- Great for DSP, FFT's, digital filtering, etc.
- Compatible with WINDOWS® and Pentium®

See page 4-7.

Quad-Output, Isolated Programmable Power Supply Board

PC-462

- 4 independently programmable, precise (12-bit), voltage outputs:
 - 0 to +6.15V @ 1 Amp
 - 0 to -6.15V @ 1 Amp
 - 0 to +20.5V @ 250mA
 - 0 to -20.5V @ 250mA
- All outputs fully isolated from PC/AT bus
- Remote sensing for each output
- Current limiting for each output
- 4 general-purpose analog inputs
- 2 isolated digital inputs
- 2 isolated relay-driver outputs
- "No programming" menued WINDOWS® software
- Free software driver library

See page 4-9.

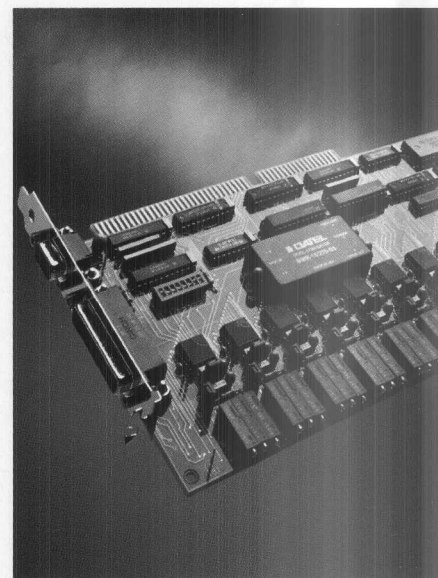
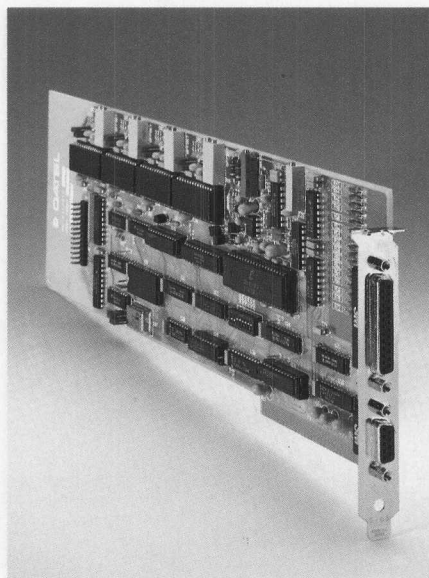
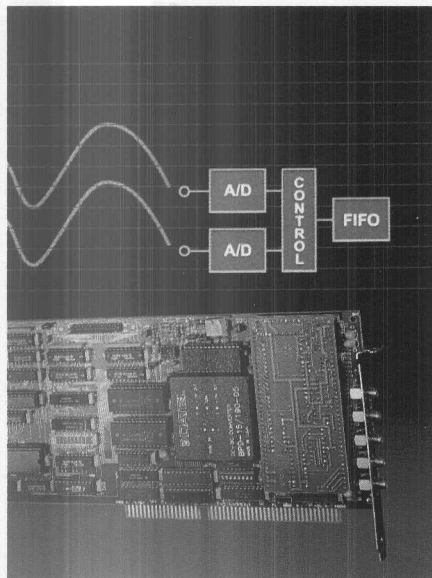
High-Performance Analog Input plus Advanced DSP Coprocessor

PC-430 Family

- Compatible with PC/AT, PS-30 and EISA computers
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling eliminates phase skew
- Local FIFO up to 4k A/D samples
- On-board TI 320C30 (32/40MHz) DSP
- Up to 4.5Mb dual-port RAM
- Two 12-bit D/A channels (opt.)
- Digital I/O (16 in, 16 out) (opt.)
- RS-232 serial port, expansion ports, timers, internal or external trigger
- On-board DSP library - FFT's, windowing, filters, floating point, etc.
- Fast, simple, powerful Command Executive - no local programming
- WINDOWS® and Pentium® compatible

See page 4-6.

New Products



2-Channel, 14-bit, 1MHz Simultaneous Sampling Analog Input Board

"G" Models of PC-414/415/430

- Compatible with PC/AT, PS-30 and EISA computers
- 2 parallel analog input channels with simultaneous sampling functions
- 2 independent, 1MHz, 14-bit A/D converters
- 500kHz input bandwidths
- -80dB total harmonic distortion
- Ideal for DSP/FFT applications
- On-board A/D FIFO memory up to 16k samples for non-stop data "streaming" to disk
- Throughput to FIFO:
 - 1MHz (single channel)
 - 2MHz (simultaneous channels)
- On-board TI 320C30 (32/40MHz) DSP (model PC-430G)

See pages 4-6, 4-7 and 4-10.

Cost-Effective Multi-Purpose A/D-D/A-Digital I/O

PC-411/412 Families

- 16 single-ended or 8 differential input channels
- Expandable to 256SE or 128D inputs (see PC-440)
- Choice of 12 or 14-bit A/D resolutions
- A/D sampling rates to 83kHz
- 4 analog output channels with simultaneous update (PC-412)
- On-board FIFO memory for non-stop "streaming" data acquisition
- Ideal for fast disk data recording
- Programmable gain amplifier (PGA) for direct sensor inputs
- Discrete digital I/O (8 in, 8 out)
- On-board programmable clock/trigger
- Ideal for process control
- Low cost per channel
- LabVIEW® drivers available

See page 4-10.

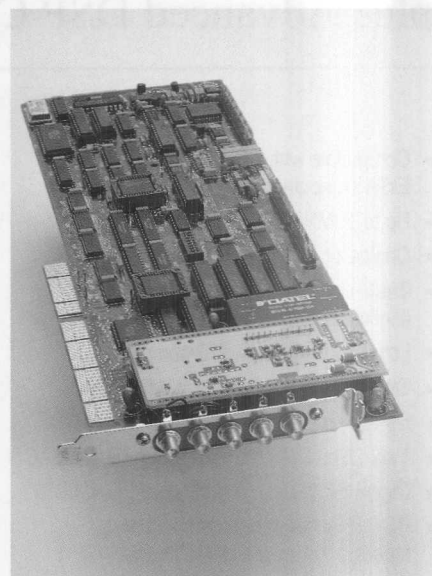
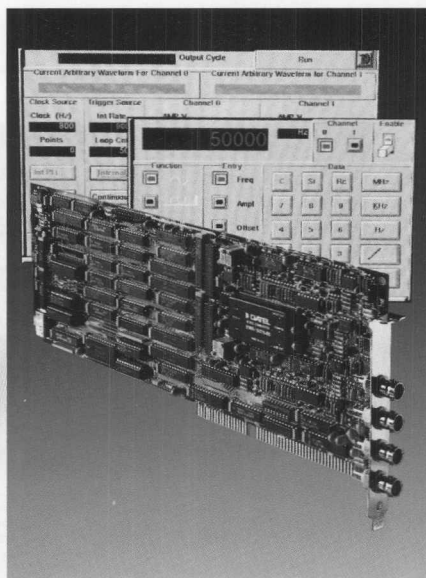
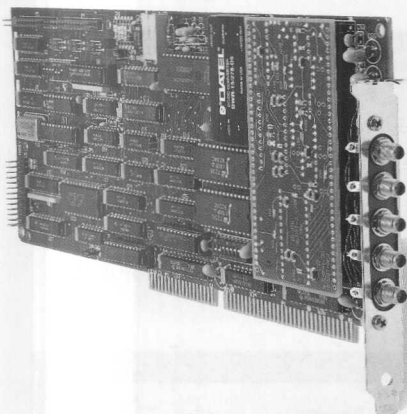
Generate 16 Fast Simultaneous Analog Outputs

PC-422

- 8 or 16 analog outputs from independent, 12-bit D/A's
- Individually selectable output ranges per channel: 0 to +5V/10V, $\pm 5V$, $\pm 10V$
- Double buffered digital input registers
- High-speed simultaneous block loading
- Simultaneous update for phase tracking and skew elimination
- On-board update clock or external event synchronization
- 3 μ sec settling, 330kHz update rate
- $\pm 0.025\%$ output linearity
- Trigger timer interrupt
- Discrete digital I/O (4 in, 4 out)
- Ideal for coherent waveform generation

See page 4-10.

New Products



Collect Millions of High-Speed, Analog Samples to Memory, Disk or Parallel Port

PC-414 Family

- Compatible with PC/AT and EISA computers
- Up to 16 analog input channels
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling eliminates phase skew
- Programmable-threshold analog input trigger
- On-board FIFO up to 16k A/D samples for non-stop, gapless, data "streaming" to disk
- 10MHz DT Connect® parallel port avoids bus delays
- Very low harmonic distortion - ideal for DSP/FFT applications
- WINDOWS® and DOS software
- LabVIEW® drivers available

See page 4-10.

High-Performance Low-Noise Arbitrary Waveform Generator

PC-420

- 2 simultaneous analog outputs with frequencies to 10MHz
- Sample update rates to 40MHz through two 12-bit D/A's
- High signal quality, -72dB THD
- On-board circular waveform memory, 32k samples per channel
- Store waveform samples on disk for playback
- High-resolution, frequency synthesized clock
- 8 software-selectable output filters per channel
- Software-programmable offset and gain
- "No programming" menued WINDOWS® software:
 - Signal waveform generator
 - Graphic waveform editor

See page 4-8.

8-Channel, 12-Bit, 250kHz Simultaneous Sampling Analog Input Board

"J" Models of PC-414/415/430

- 8 parallel analog input channels with concurrent sampling
- 8 independent, 12-bit, 250kHz A/D converters
- Eliminate phase skew on 8 parallel channels
- 200kHz input bandwidths
- -77dB total harmonic distortion
- Ideal for DSP/FFT applications
- On-board A/D FIFO memory up to 16k samples for non-stop data "streaming" to disk
- Throughput to FIFO:
 - 250kHz (single channel)
 - 2MHz (simultaneous channels)
- On-board TI 320C30 (32/40MHz) DSP (model PC-430J)

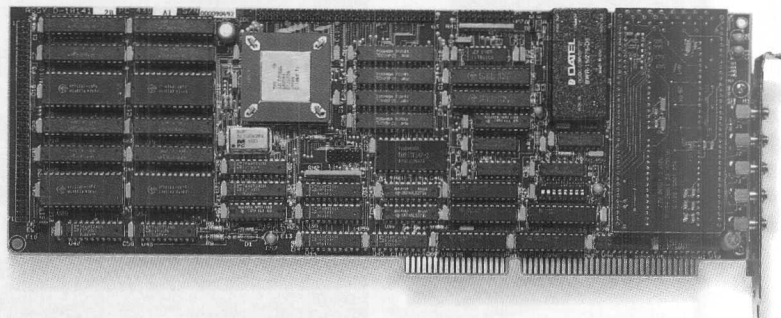
See pages 4-6, 4-7 and 4-10.

PC-430 Family

High-Performance Analog Input plus Advanced DSP Coprocessor

**FEATURE
PRODUCTS**

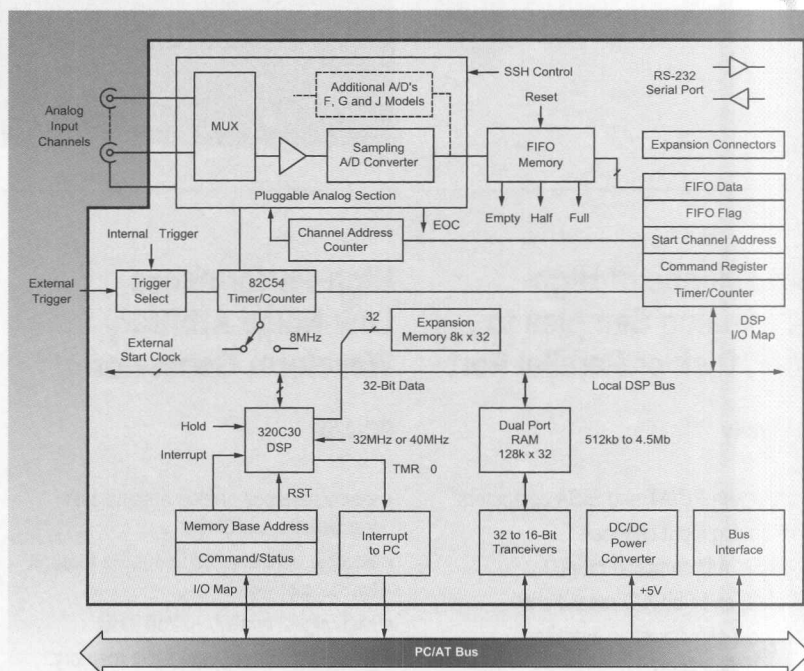
- Compatible with PC/AT, PS-30 and EISA computers
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling eliminates phase skew
- Local FIFO up to 4k A/D samples
- On-board TI 320C30 (32/40MHz) DSP
- Up to 4.5Mb dual-port RAM
- Two 12-bit D/A channels (opt.) PC-430DAC
- Digital I/O (16 in, 16 out) (opt.) PC-430DIG
- RS-232 serial port, expansion ports, timers, internal or external trigger
- On-board DSP library - FFT's, windowing, filters, floating point, etc.
- Fast, simple, powerful Command Executive - no local programming
- WINDOWS® and Pentium® compatible



The PC-430 Family of A/D-DSP boards combine fast, high-resolution, low-noise, analog front ends with the advanced processing power of the Texas Instruments' TI320C30 DSP CPU. The board's unique architecture (on-board A/D FIFO memory, local 32-bit DSP bus, on-board DSP expansion RAM, on-board dual-port RAM shared with the PC/AT bus, multiple triggering schemes, etc.) enables it to perform local, complex, data preprocessing "on the fly" while maintaining non-stop "gapless" data streaming to mass storage.

The PC-430 Family offers nine different analog input options ranging from single channels to 8 parallel, simultaneously sampled channels. A/D converter resolutions can be either 12 or 14 bits. A/D conversion rates range from 250kHz to 10MHz.

The PC-430 appears as both I/O and memory addresses to the host PC. A comprehensive Executive software package offers fast A/D sample collection and DSP math without writing any local programs. A simple, powerful, high-speed command list is used to access the local DSP library. The board is ideal for non-stop continuous FFT processing, communications receiver signal collection to disk, or simultaneous graphics display of spectral data.



Ordering Information

PC-

CPU Speed

430 = 32MHz
(standard)
430/40 = 40MHz
(special order)

Input Channels, A/D Resolution and Speed

A = 4 SE simul. chans., 12 bits, 1.5MHz
B = 4 SE chans., 14 bits, 500kHz
C = 4 SE chans., 12 bits, 1.6MHz
D = 1D chan., 12 bits, 5MHz
E = 16SE/8D chans., 12 bits, 2MHz
F = 2SE simul. chans., 12 bits, 2MHz
G = 2SE simul. chans., 14 bits, 1MHz
H = 1D chan., 12 bits, 10MHz*
J = 8SE simul. chans., 12 bits, 250kHz

* Enhanced PC-430 only. Contact DATEL for availability

"J" Model Input Range

A = 0 to +5V
B = $\pm 5V$

FIFO Memory Size

1 = 1k A/D samples
2 = 4k A/D samples

Expansion Memory:

MEM-30 1 Megabyte expansion SRAM (256k x 32). Total installed capacity is 1.5Mb.
MEM-30B 4 Megabyte expansion SRAM (1M x 32). Total installed capacity is 4.5Mb.

Software:

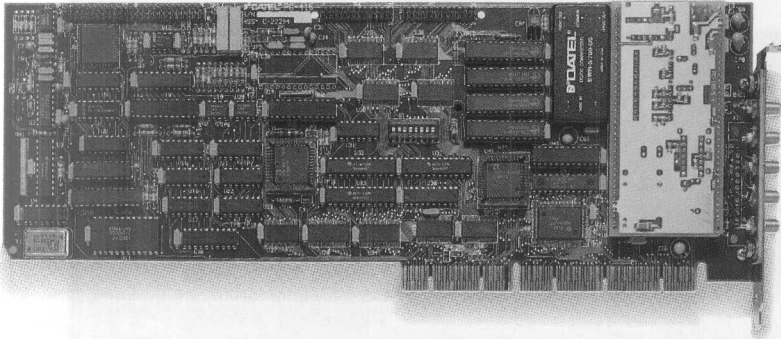
PC-430EXEC Executive, Commander and Scheduler, executables only, MS-DOS disks.
PC-430SRC Full source code for PC-430EXEC. Requires Borland and TI "C." Includes MS-DOS Windows Boss library.
PC-430WIN Microsoft Windows 3.1 version of PC-430EXEC. Requires Microsoft Visual C++, MASM, and TI "C."
PC-430LV LabVIEW® virtual instrument drivers.
PC-430HYPER Hyperception integrated control/store/display system.
PC-430BUG Debugger/monitor and manual.
UM-CMDRSRC Commander software manual (included with Commander).

Serial-Port Daughter Modules:

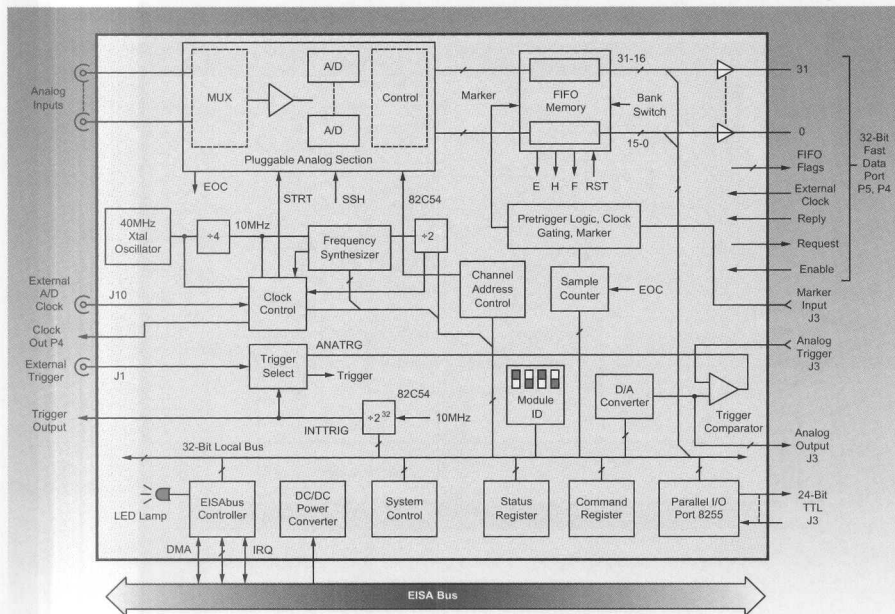
PC-430DAC Two, 12-bit 100kHz D/A Converters
PC-430DIG 32 lines, TTL compatible, digital I/O

PC-415 Family

Ultra-Performance, Analog Input Boards for EISA Computers



- The ideal array-processor "front end"
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- Wideband inputs with low harmonic distortion
- Quick, 32-bit, EISA block transfers
- 2/4/8-channel simultaneous sampling eliminates phase skew
- On-board A/D FIFO memory to 32k samples
- 32 megasample or greater data streaming
- Pre/post-trigger, gap-free, ring buffering
- Great for DSP, FFT's, digital filtering, etc.
- Compatible with WINDOWS® and Pentium®



The PC-415 Family consists of 9 advanced-performance, data acquisition boards based on the 32-bit EISAbus architecture. With an emphasis on continuous, non-stop, high-speed streaming of A/D samples to host memory or disk, the system has been optimized for a wide range of signal-processing and data-recording applications. In very long "baseline" studies or high-speed transient analysis, the PC-415 can collect more than 64 megabytes of "seamless" digitized data to EISA memory.

Typical EISA transfers are made at 14 megasamples per second in mode C DMA 1k bursts. Exploiting a unique "banked" FIFO architecture, the PC-415 moves two A/D words in each 32-bit EISA transfer. The FIFO memory (up to 8k samples deep) serves to decouple the precise timing of the A/D converter from the block bursts of the EISA bus.

The PC-415's optional analog front-ends all utilize DATEL's low-noise, wide-bandwidth A/D converters. All models exhibit excellent harmonic distortion and perform well in DSP/FFT applications. Our PC-415SET software readily implements a menu-driven, "no-programming," fast data recording system to memory. Both WINDOWS® and DOS versions are available.

Ordering Information

PC-415

Input Channels, A/D Resolution and Speed

A = 4 SE simul. chans., 12 bits, 1.5MHz
B = 4 SE chans., 14 bits, 500kHz
C = 4 SE chans., 12 bits, 1.6MHz
D = 1D chan., 12 bits, 5MHz
E = 16SE/8D chans., 12 bits, 2MHz
F = 2SE simul. chans., 12 bits, 2MHz
G = 2SE simul. chans., 14 bits, 1MHz
H = 1D chan., 12 bits, 10MHz
J = 8SE simul. chans., 12 bits, 250kHz

FIFO Memory Size

1 = 2k A/D samples
2 = 8k A/D samples
(other sizes on special order)

"J" Model Input Range

A = 0 to +5V
B = ±5V

61-7342340 SMA male to BNC male coaxial cable, 1 meter length. One cable required per channel.
PC-490B DB-25 screw termination adapter, 25-pin for PC-415E.

Each board is power-cycle burned-in, tested, and calibrated. All models include a user's manual. A low-level "C" library source disk is available on request at no charge.

Software:

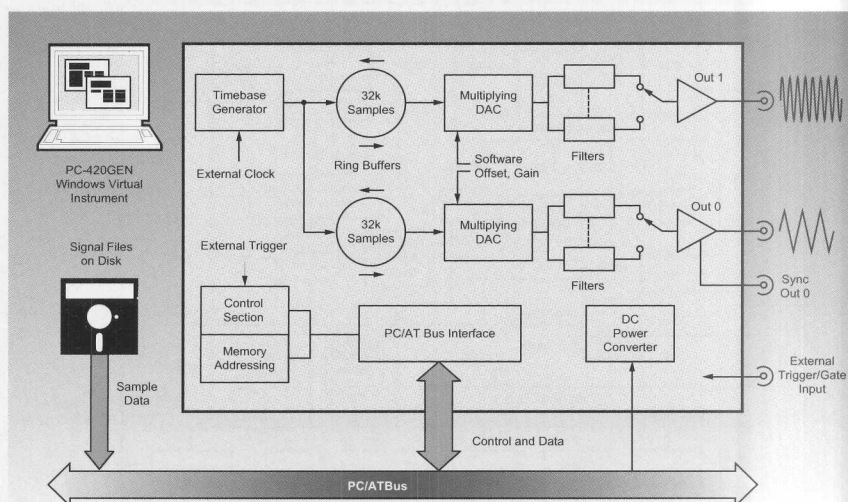
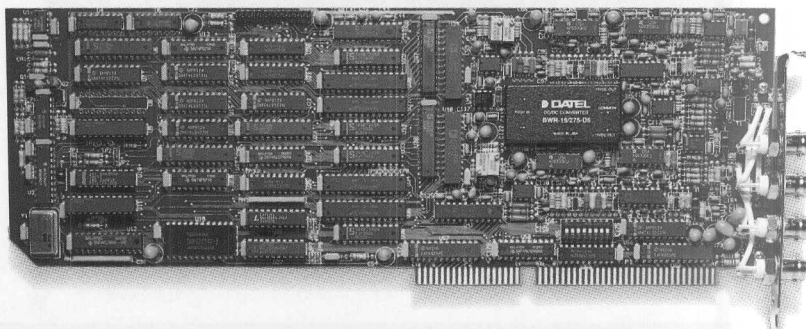
PC-415SET Setup/configuration program for MS-DOS. Executables only.
PC-415SRC Source code for setup and configuration program on MS-DOS disks. Includes "C" and assembly source code. Documentation is on disk.
PC-415WIN Setup/configuration program for Microsoft WINDOWS 3.1. Executables only.
PC-415WINS Source code for PC-415WIN.

PC-420

Low-Noise, Low-Distortion Arbitrary Waveform Generator

FEATURE
PRODUCTS

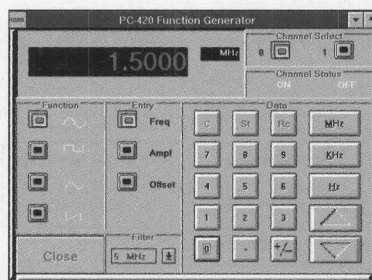
- 2 simultaneous analog outputs with frequencies to 10MHz
- Sample update rates to 40MHz through two 12-bit D/A's
- High signal quality, -72dB THD
- On-board circular waveform memory, 32k samples per channel
- Store waveform samples on disk for playback
- High-resolution, frequency synthesized clock
- 8 software-selectable output filters per channel
- Software-programmable offset and gain
- "No programming" menued WINDOWS® software:
Signal waveform generator
Graphic waveform editor



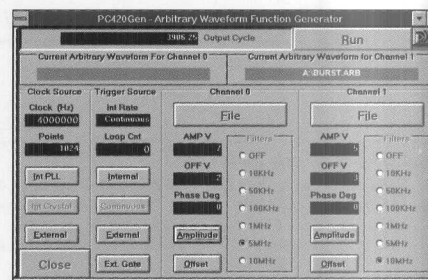
The PC-420 is an easy-to-use arbitrary waveform generator board that is totally contained within a PC/AT, PS-30 or EISA bus computer. It has two, high-speed, highly precise output channels for simultaneously generating complex periodic and/or aperiodic signals. Its PC-420GEN WINDOWS® software makes the PC-420 a virtual instrument that enables you to quickly synthesize any conceivable waveform.

Each output channel has its own waveform RAM (32k samples each) into which pattern data is loaded from the host computer. Sample points are then clocked from the buffers to high-speed 12-bit D/A converters at rates up to 40MHz. A fixed-frequency reference clock drives a phase locked loop (PLL) to minimize the phase jitter, transient response, and resolution problems encountered in earlier synthesizer designs.

Each output channel has 8 different software-selectable, fixed-frequency, low-pass filters to ensure signal spectral purity. These third-order Butterworth filters offer cutoff frequencies from 10kHz to 10MHz. Wideband output amplifiers minimize distortion and exhibit excellent pulse response characteristics.



PC-420GEN Standard Waveform Panel



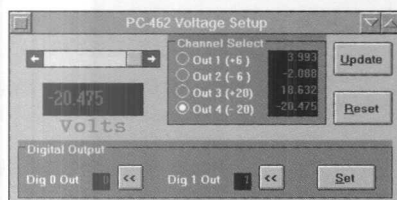
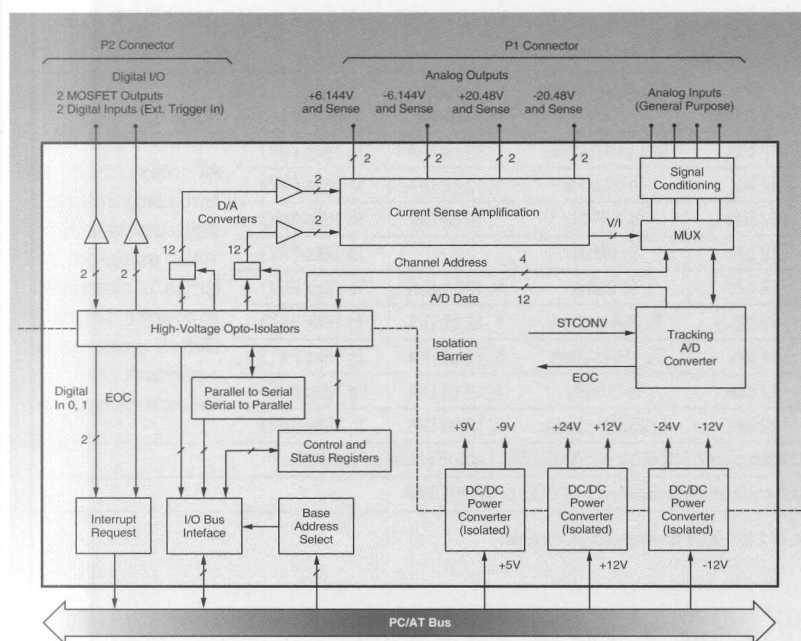
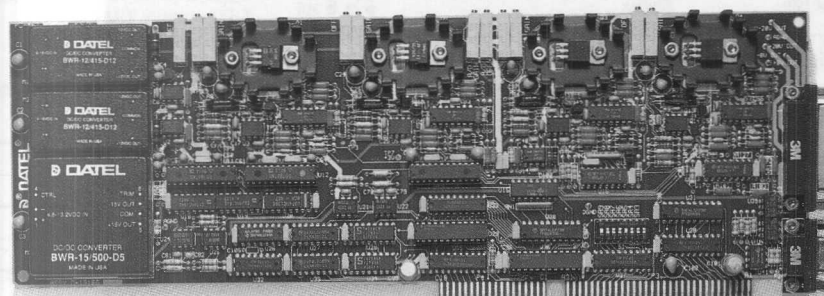
PC-420GEN Arbitrary Waveform Panel

Ordering Information

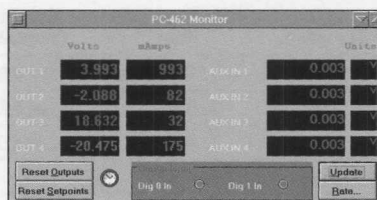
Model	Description
PC-420	Arbitrary waveform generator board. Includes a comprehensive user manual and low-level driver library disks.
PC-420GEN	Waveform definition/generation software utility, written under Microsoft Windows 3.1 (or higher).
PC-420SRC	Complete source code listing for PC-420GEN.

PC-462

Precision, Quad-Output Programmable Power Supply Board



PC-462SET Voltage Setup



PC-462SET Voltage/Current Monitor

- 4 independently programmable, precise (12-bit), voltage outputs:
 - 0 to +6.15V @ 1 Amp
 - 0 to -6.15V @ 1 Amp
 - 0 to +20.5V @ 250mA
 - 0 to -20.5V @ 250mA
- All outputs fully isolated from PC/AT bus
- Remote sensing for each output
- Current limiting for each output
- 4 general-purpose analog inputs
- 2 isolated digital inputs
- 2 isolated relay-driver outputs
- "No programming" menued WINDOWS® software
- Free software driver library

The PC-462 is a quad-output, programmable power supply board that is totally contained within a PC/AT, PS-30 or EISA bus computer. It is ideal for applications demanding stable, highly accurate, low-noise, low-ripple, supply voltages or currents.

The PC-462's 4 outputs are fully isolated (250Vrms) from the PC bus and individually programmable via 12-bit D/A converters. Each output has its own remote sense pin, and the board also has a four-channel A/D converter for output monitoring. All four outputs have current-limiting protection and automatically reset to zero on power up.

The board also offers 4 isolated digital I/O lines. The 2 input lines can be used to generate host interrupts. The two outputs can drive relays or MOSFET's for switching heavy loads. All input and output channels are available on two D-type connectors on the rear panel.

The PC-462 offers comprehensive, WINDOWS® compatible, graphic intensive software that allows it to be easily integrated into any PC-based benchtop application.

Ordering Information

Model	Description
PC-462	Programmable power supply board. Includes a comprehensive user's manual and low level driver library.
PC-462SET	Window-driven setup/configuration software utility. All software runs under Microsoft WINDOWS.
PC-462SRC	Complete source code to setup/configuration utility.
PC-490A/B	Screw termination adapter to facilitate input/output wiring (490A DB-9, 9-pin; 490B DB-25, 25-pin).

Combination Analog and Digital Input/Output

Model	Input Channels ①	Input Ranges ②	A/D Resolution	A/D Conversion Rate	Output Channels	Digital I/O	Notes
PC-411A1	16SE/8D	0 to +5V or ±5V	12 bits	83kHz	--	8 in, 8 out	Expandable to 256SE/128D channels. Programmable gain amplifier (G = 1 to 100). On-board FIFO memory, DMA and programmable interrupts for continuous "streaming" data acquisition. Simultaneous update (200kHz) for D/A's.
PC-411B1	16SE/8D	0 to +5V or ±5V	14 bits	59kHz	--	8 in, 8 out	
PC-412A1	16SE/8D	0 to +5V or ±5V	12 bits	83kHz	4, 12-bit D/A's	8 in, 8 out	
PC-412B1	16SE/8D	0 to +5V or ±5V	14 bits	59kHz	4, 12-bit D/A's	8 in, 8 out	
PC-440	32SE/16D	Slave A/D channel expander, cascable up to 256SE/128D channels					
PC-411SET	Setup, configuration, data save software - executables only. LabVIEW drivers available.						
PC-411SRC	Setup, configuration, data save software - source code and executables. LabVIEW drivers available.						
PC-490A/B	Screw termination -- 9-pin (490A) or 25-pin (490B)						

① Input channel options are software-selectable. ② Input ranges are software-selectable.

High-Speed Analog Input Plus Memory

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
PC-414A	4SE simul.	0 to +1V/10V, ±1V/10V ①	12 bits	To 1.5MHz/chan.	1, 12-bit D/A	To 16ks FIFO	All models of the PC-414 have a programmable trigger/counter and a 10MHz parallel port. All but the "D" model have an on-board, 12-bit D/A (200kHz update rate) and a programmable-threshold analog trigger.
PC-414B	4SE	0 to +10V, ±5V, ±10V	14 bits	To 500kHz	1, 12-bit D/A	To 16ks FIFO	
PC-414C	4SE	0 to +10V, ±5V, ±10V	12 bits	To 1.6MHz	1, 12-bit D/A	To 16ks FIFO	
PC-414D	1D	±5V	12 bits	To 5MHz	--	To 16ks FIFO	
PC-414E	16SE/8D	50mV to 10V ②	12 bits	To 2MHz	1, 12-bit D/A	To 16ks FIFO	
PC-414F	2SE simul.	0 to +10V, ±5V	12 bits	To 2MHz/chan.	1, 12-bit D/A	To 16ks FIFO	
PC-414G	2SE simul.	0 to +10V, ±5V	14 bits	To 1MHz/chan.	1, 12-bit D/A	To 16ks FIFO	
PC-414H	1D	±5V	12 bits	To 10MHz	1, 12-bit D/A	To 16ks FIFO	
PC-414J	8SE simul.	0 to +5V, ±5V	12 bits	To 250kHz/chan.	1, 12-bit D/A	To 16ks FIFO	
PC-414SET/WIN	Setup, configuration, data save software - executables only, MS-DOS or WINDOWS. LabVIEW drivers available.						
PC-414SRC/WINS	Setup, configuration, data save software - source code and executables, MS-DOS or WINDOWS						

① Gains of 1 or 10 are user-selectable on 2 channels. ② Gain of 1 to 100 is resistor-programmable.

High-Speed Analog Input Plus Memory for EISA

See page 4-7.

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
PC-415A	4SE simul.	0 to +1V/10V, ±1V/10V ①	12 bits	To 1.5MHz/chan.	1, 12-bit D/A	To 8ks FIFO	The PC-415 employs a “banked” FIFO architecture to exploit 32-bit EISA block transfers. All models have a programmable trigger/counter and a 10MHz parallel port. All but the “D” model have an on-board, 12-bit D/A (200kHz update rate) and a programmable-threshold analog trigger.
PC-415B	4SE	0 to +10V, ±5V, ±10V	14 bits	To 500kHz	1, 12-bit D/A	To 8ks FIFO	
PC-415C	4SE	0 to +10V, ±5V, ±10V	12 bits	To 1.6MHz	1, 12-bit D/A	To 8ks FIFO	
PC-415D	1D	±5V	12 bits	To 5MHz	--	To 8ks FIFO	
PC-415E	16SE/8D	50mV to 10V ②	12 bits	To 2MHz	1, 12-bit D/A	To 8ks FIFO	
PC-415F	2SE simul.	0 to +10V, ±5V	12 bits	To 2MHz/chan.	1, 12-bit D/A	To 8ks FIFO	
PC-415G	2SE simul.	0 to +10V, ±5V	14 bits	To 1MHz/chan.	1, 12-bit D/A	To 8ks FIFO	
PC-415H	1D	±5V	12 bits	To 10MHz	1, 12-bit D/A	To 8ks FIFO	
PC-415J	8SE simul.	0 to +5V, ±5V	12 bits	To 250kHz/chan.	1, 12-bit D/A	To 8ks FIFO	
PC-415SET/WIN	Setup, configuration, data save software - executables only, MS-DOS or WINDOWS						
PC-415SRC/WINS	Setup, configuration, data save software - source code and executables, MS-DOS or WINDOWS						

① Gains of 1 or 10 are user-selectable on 2 channels. ② Gain of 1 to 100 is resistor-programmable.

Fast A/D-DSP Coprocessor and Software

See page 4-6.

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
PC-430A	4SE simul.	0 to +1V/10V, $\pm 1V/10V$ ①	12 bits	To 1.5MHz/chan.	--	To 4ks FIFO	All models of the PC-430 incorporate a 32MHz (40MHz optional) TI320C30 DSP CPU operating on a local, 32-bit data bus. All have installed 1/2Mb dual-port SRAM expandable to 4.5Mb with MEM-30. All have an on-board, programmable timer/counter and offer multiple triggering schemes.
PC-430B	4SE	0 to +10V, $\pm 5V$, $\pm 10V$	14 bits	To 500kHz	--	To 4ks FIFO	
PC-430C	4SE	0 to +10V, $\pm 5V$, $\pm 10V$	12 bits	To 1.6MHz	--	To 4ks FIFO	
PC-430D	1D	$\pm 5V$	12 bits	To 5MHz	--	To 4ks FIFO	
PC-430E	16SE/8D	50mV to 10V ②	12 bits	To 2MHz	--	To 4ks FIFO	
PC-430F	2SE simul.	0 to +10V, $\pm 5V$	12 bits	To 2MHz/chan.	--	To 4ks FIFO	
PC-430G	2SE simul.	0 to +10V, $\pm 5V$	14 bits	To 1MHz/chan.	--	To 4ks FIFO	
PC-430H	1D	$\pm 5V$	12 bits	To 10MHz	--	To 4ks FIFO	
PC-430J	8SE simul.	0 to +5V, $\pm 5V$	12 bits	To 250kHz/chan.	--	To 4ks FIFO	
PC-430DAC	--	0 to +5V/10V, $\pm 5V/10V$ ③	--	100kHz ④	2, 12-bit D/A's	--	
PC-430DIG	16 TTL	Digital I/O	--	To 500kHz	16 TTL	--	PC-430 serial-port daughter modules, dual DAC or digital I/O
MEM-30/30B	1Mb or 4Mb SRAM memory expander module for PC-430						
PC-430EXEC/WIN	"No programming" command scheduler, DSP library software (executables), MS-DOS or WINDOWS. LabVIEW drivers available.						
PC-430SRC/WINS	"No programming" command scheduler, DSP library software (full source code), MS-DOS or WINDOWS						
PC-430HYPER	Hyperception integrated DSP display, data save software, digital oscilloscope, spectrum analyzer						
PC-430BUG	Assembly/C language debugger/monitor, single step, object file load/save software						

① Gains of 1 or 10 are user-selectable on 2 channels. ② Gain of 1 to 100 is resistor-programmable. ③ Output voltage ranges. ④ D/A update rate.

Fast, Simultaneous Analog Output

Model	Output Channels	Output Ranges	D/A Resolution	D/A Update Rate	Digital I/O	Trigger Timer Interrupt	Notes
PC-422A	8 Simultaneous	0 to +5V, +10V ±2.5V, ±5V, ±10V	12 bits	330kHz	4 in, 4 out	500ns to 537 seconds	Arbitrary waveform/ function generators. Simultaneous update. Output ranges selectable per channel.
PC-422B	16 Simultaneous	0 to +5V, +10V ±2.5V, ±5V, ±10V	12 bits	330kHz	4 in, 4 out	500ns to 537 seconds	
PC-422SET	Setup, data load, file playback software - executables only						
PC-422SRC	Setup, data load, file playback software - source code						

Special Functions

See page 4-8, 4-9.

Model	Description	Analog I/O Channels	Notes
PC-462	Programmable Power Supply Board	4 isolated outputs: 0 to +6.15V / -6.15V @ 1A 0 to +20.5V / -20.5V @ 250mA. 4 isolated inputs ($\pm 5V$)	4 isolated digital channels (2 in, 2 out), 12-bit A/D-D/A conversion, remote load sense
PC-462SET	Configuration, display/load software for WINDOWS (executables)		
PC-462SRC	Configuration, display/load software for WINDOWS (source code)		
PC-420	Arbitrary Waveform Generator	2 simultaneous outputs: update rates to 40MHz, 12-bit D/A's, programmable offset/attenuation	64k waveform RAM per channel, external trigger, 8 selectable filters
PC-420SET	Configuration, waveform load/edit software for WINDOWS (executables)		
PC-420SRC	Configuration, waveform load/edit software for WINDOWS (source code)		

Contact your local DATEL sales office for data sheets on products listed in this catalog.

Windowed Lab, ATE and DSP Software

PC-"SET" Series

- Low-cost, easy-to-use setup, configuration, data save/load software for PC-411, 412, 414, 462, 422, 415.
- Save data to disk or memory at rates exceeding 1MHz. Full source code available ("SRC" series). MS-DOS or WINDOWS.
- Windowed "no-programming" menu interface. File output to PC-DADiSP or spreadsheets.
- Batchable autorun mode.

PC-DADiSP

- High-quality, file input A/D data graphics display and analysis worksheet software.
- Use with any A/D signal file. Extensive math library, over 300 functions, FFT's, filters, 3D plotting, etc.
- Powerful macro math language, multi-Window displays, publication-quality graphics output.

PC-430HYPER

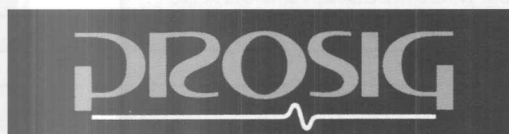
- High-performance real-time data acquisition, graphics display, data file save/playback and DSP library for DATEL's PC-430.
- Multi-channel digital oscilloscope, spectrum analyzer, FFT display, digital filtering, autocorrelation, code generation, and many more!

PC-430LV, PC-412LV and PC-414LV

- LabVIEW® Virtual Instrument software library for DATEL's PC-430, PC-411/412 and PC-414 analog input boards.
- Includes fast, low-level, graphic, block diagram programming functions.
- Adaptable to all LabVIEW® applications.
- Ideal for high-performance data acquisition, DSP, FFT's, digital filtering, etc.
- Effective in implementing non-stop "streaming" of A/D data to disk, graphic screen or control loops.

LabVIEW® is a trademark of National Instruments

High-Performance Software is also available from these DATEL Partners. Contact DATEL for information.



- Prosig - The clearest picture in spreadsheet signal processing.
- Supports DATEL PC-411/412 and PC-414 A/D-FIFO boards.
- Ideal "what if?" processor. Store analysis steps directly in a spreadsheet.
- Easy learning and fast results ... intuitive interface ... rich, windowed test environment. Get results minutes after installation.
- WYSIWYG graphics ... add your text then plot in background while collecting the next A/D data set.
- Applications: vibration studies, acoustics and speech analysis, medical/biological research, structural dynamics/analysis, etc.



- Signal Centre - Easy-to-use, "no programming," block diagram A/D-D/A software
- Watch your data, through multiple viewports, as it is collected.
- Link signals, events and triggers together with structure dialogue boxes.
- High-quality screen display and presentation plotting.
- Powerful, logical, statistics and math libraries.
- Turn-key "load and go." Log data to disk, simulate an instrument, etc.

New DATEL Products in Development

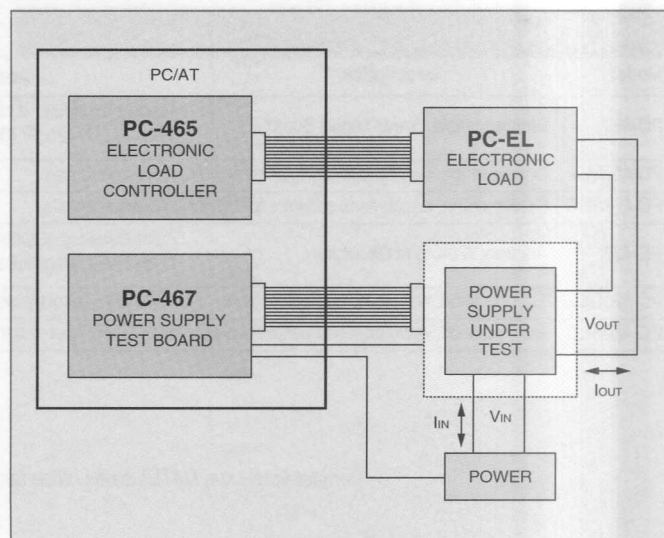
PC-465/PC-467 Complete, PC-Based, Power-Supply Test Station

The PC-465 Electronic Load Controller Board, PC-EL Electronic Load, and the PC-467 Power Supply Test Board together will configure a complete, totally PC controlled, power supply test/evaluation station that can accurately measure virtually any parameter listed on a typical DC/DC converter data sheet. The test station can be used for product evaluation, incoming inspection and even high-volume production testing.

The Controller Board uses buffered 12-bit D/A converters to generate analog output signals of variable amplitude, pulse width, duty cycle, rise and fall time, etc. The Electronic Load functions as a voltage-controlled current source that can either sink or source current, emulate an ideal resistor, or even act as a "electronic" short. Multiple loads may be used in parallel to increase total load.

The PC-467 exploits a combination of pure analog measurement techniques and high-speed, high-resolution A/D converters (for highly accurate digitized measurements) to record the instantaneous values of the input and output parameters of the power supply under test.

The PC-465/467 Power Supply Test Station will function as a virtual instrument with WINDOWS compatible software. Tests that can be routinely performed will include measuring input current and voltage, output current and voltage, line and load regulation, input and output ripple (amplitude and frequency), transient response, input/output turn on/off characteristics, efficiency, current limiting, short-circuit testing, etc. The user friendly, menu driven software will allow easy data recording, manipulation and display. Contact DATEL for details.



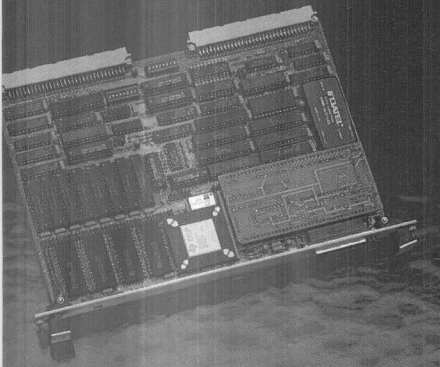


ME continues to be the premier, high-performance bus around the world, and DATEL continues to be one of its strongest supporters.

VME users prefer its strong standardization, rugged pin and socket backplane interface, and wide variety of host CPU systems. Once considered a "research" bus relegated to government laboratories and the military/aerospace industry, VME is now the preferred bus for advanced applications in many commercial/industrial markets.

DATEL designs, develops and manufactures quality, high-performance, analog boards for all types of VME applications. In data acquisition, our products include high-speed, high-resolution, analog input boards with multiple input channels and on-board memory. For sophisticated DSP applications, we offer analog input boards with on-board DSP coprocessors and expansion SRAM. For analog outputs, we offer signal-generator boards with as many as 16 output channels as well as fully isolated, quad-output, power-supply boards.

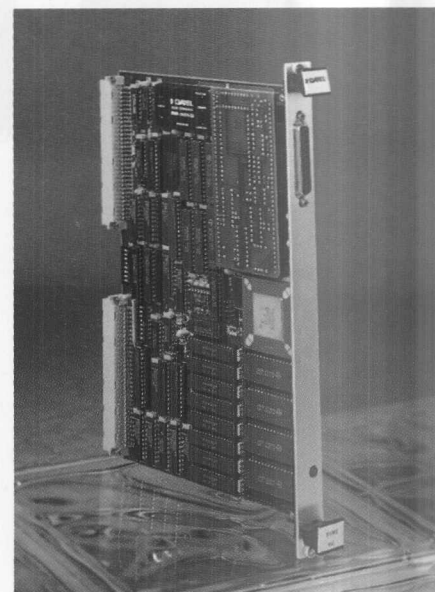
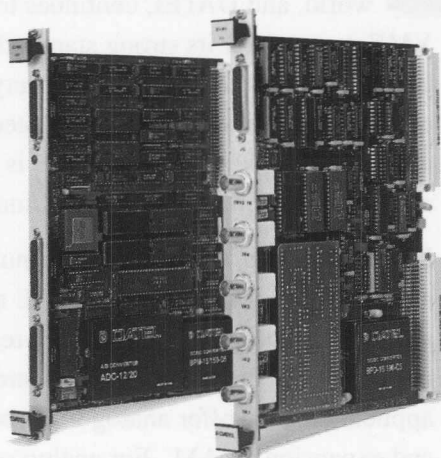
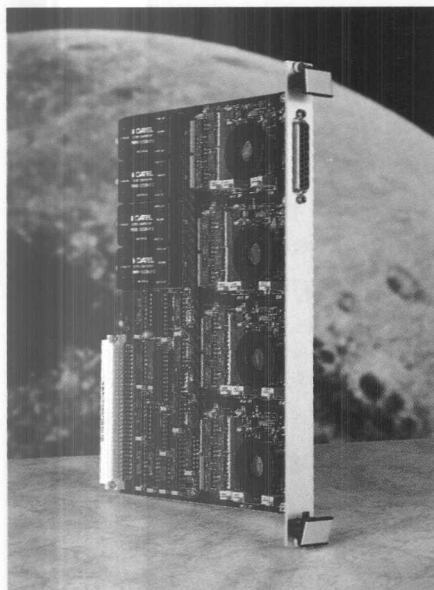
We give patient, experienced, applications assistance and willingly "customize" standard products for OEM applications. Consider DATEL products for your next VME application.



Analog Boards for VME Bus and Multibus I

New Products	5-2
Feature Products:	
DVME-630 Analog Input plus DSP Coprocessor	5-4
DVME-614 High-Speed Analog Board with FIFO	5-5
Product Selection Guides - VME Hardware	5-6
Product Selection Guides - Software	5-6
Product Selection Guides - Multibus Hardware	5-7

New Products



Fully Isolated, Precision 4-Channel, Programmable Power Supply Board

DVME-621

- 4 independently programmable, voltage/current outputs:
 - 0 to +11V, $\pm 11V$ @ 100mA
 - 0 to +20/50/160mA, $\pm 160mA$
- Highly accurate, 12-bit D/A for each channel
- Digital inputs to D/A's opto isolated from data bus
- Each D/A powered by fully isolated DC/DC converter
- 500Vrms channel-to-channel and channel-to-bus isolation
- Output overvoltage and short-circuit protection
- Remote sensing for each output
- Ideal for process control and industrial automation
- Free software driver library

See page 5-7.

2-Channel, 14-bit, 1MHz Simultaneous Sampling Analog Input Board

"G" Models of DVME-614/630

- 2 parallel analog input channels with simultaneous sampling
- 2 independent, 1MHz, 14-bit A/D converters
- 500kHz input bandwidths
- -80dB total harmonic distortion
- Ideal for DSP/FFT applications
- On-board A/D FIFO memory up to 16k samples for non-stop data "streaming" to disk
- Throughput to FIFO:
 - 1MHz (single channel)
 - 2MHz (simultaneous channels)
- On-board TI 320C30 (32/40MHz) DSP (model DVME-630G)

See pages 5-4 and 5-5.

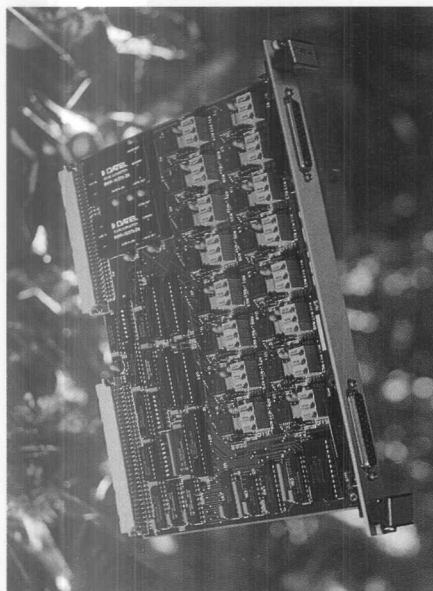
Capture and Analyze Analog Signals with Advanced A/D-DSP Coprocessor

DVME-630 Family

- Up to 16SE/8D analog input channels
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling
- Local FIFO up to 4k A/D samples
- On-board TI 320C30 (32/40MHz) digital signal processor
- Two 12-bit D/A channels (opt.)
- Digital I/O (16 in, 16 out) (opt.)
- Up to 4.5Mb dual-port RAM
- Vectored interrupt to VME host
- On-board DSP library - FFT's windowing, filters, floating point, etc.
- Fast, simple, powerful Command Executive - no local programming

See pages 5-4 and 5-7.

New Products

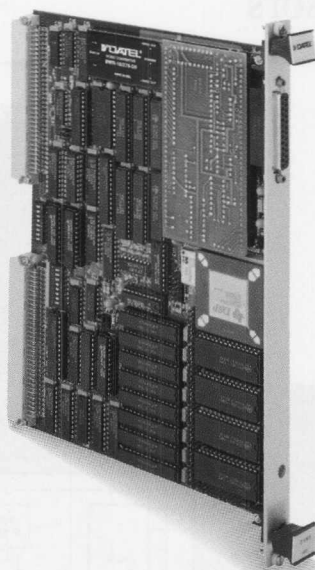


Generate 16 Fast Simultaneous Analog Outputs

DVME-622

- 8 or 16 analog outputs from independent 12-bit D/A's
- Individually selectable output ranges per channel: 0 to +5V, 0 to +10V, $\pm 2.5V$, $\pm 5V$, $\pm 10V$
- Double buffered digital input registers
- High-speed simultaneous block loading
- Simultaneous update for phase tracking and skew elimination
- On-board update clock or external event synchronization
- 3 μ sec settling, 330kHz update rate
- $\pm 0.025\%$ output linearity
- Trigger timer interrupt
- Discrete digital I/O (4 in, 3 out)
- Ideal for coherent waveform generation

See page 5-7.

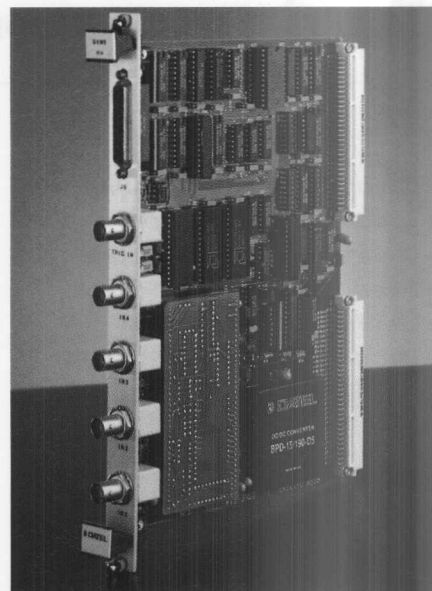


8-Channel, 12-Bit, 250kHz Simultaneous Sampling Analog Input Board

"J" Models of DVME-614/630

- 8 parallel analog input channels with concurrent sampling
- 8 independent, 12-bit, 250kHz A/D converters
- Eliminate phase skew on 8 parallel channels
- 200kHz input bandwidths
- $-77dB$ total harmonic distortion
- Ideal for DSP/FFT applications
- On-board A/D FIFO memory up to 16k samples for non-stop data "streaming" to disk
- Throughput to FIFO:
250kHz (single channel)
2MHz (simultaneous channels)
- On-board TI 320C30 (32/40MHz) DSP (model DVME-630J)

See pages 5-4 and 5-5.



Collect Millions of High-Speed, Analog Samples to Disk or Memory

DVME-614 Family

- Up to 16 analog input channels
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling eliminates phase skew
- Programmable-threshold analog input trigger
- On-board FIFO up to 16k A/D samples for non-stop, gapless, data "streaming" to disk
- 10MHz parallel port avoids bus delays
- Direct streaming to host memory to 64Mb or greater
- Very low harmonic distortion - ideal for DSP/FFT applications
- Excellent array-processor "front end"

See pages 5-5 and 5-6.

DVME-630 Family

High-Performance, Analog Input Boards with DSP Coprocessors

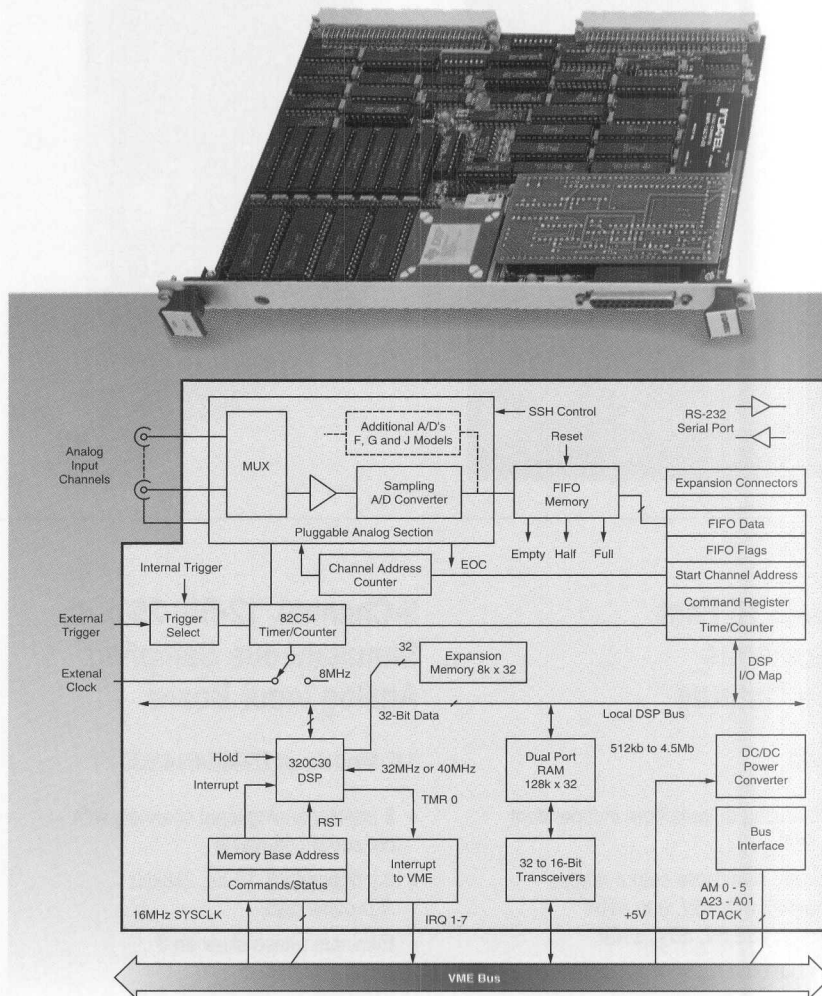
**FEATURE
PRODUCTS**

- Up to 16SE/8D analog input channels
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling
- Local FIFO up to 4k A/D samples
- On-board TI 320C30 (32/40MHz) digital signal processor
- Two 12-bit D/A channels (opt.)
- Digital I/O (16 in, 16 out) (opt.)
- Up to 4.5Mb dual-port RAM
- Vectored interrupt to VME host
- On-board DSP library - FFT's windowing, filters, floating point, etc.
- Fast, simple, powerful Command Executive - no local programming

The DVME-630 Family of A/D-DSP boards combine fast, high-resolution, low-noise, analog front ends with the advanced processing power of the Texas Instruments' TI320C30 DSP CPU. The board's unique architecture (on-board A/D FIFO memory, local 32-bit DSP bus, on-board DSP expansion RAM, on-board dual-port RAM shared with the host VME bus, multiple triggering schemes, etc.) enables it to perform local, complex, data preprocessing "on the fly" while maintaining non-stop "gapless" data streaming to mass storage.

The DVME-630 Family offers nine different analog input options ranging from single channels to 8 parallel, simultaneously sampled channels. A/D converter resolutions can be either 12 or 14 bits. A/D conversion rates range from 250kHz to 10MHz.

A comprehensive Executive software package offers fast A/D sample collection and DSP math without writing any local programs. A simple, powerful, high-speed command list is used to access the local DSP library. The board is ideal for non-stop continuous FFT processing, communications receiver signal collection to disk, or simultaneous graphics display of spectral data.



Ordering Information

DVME

CPU Speed

630 = 32MHz (standard)
630/40 = 40MHz (special order)

Input Channels, A/D Resolution and Speed

A = 4 SE simul. chans., 12 bits, 1.5MHz
B = 4 SE chans., 14 bits, 500kHz
C = 4 SE chans., 12 bits, 1.6MHz
D = 1D chan., 12 bits, 5MHz
E = 16SE/8D chans., 12 bits, 2MHz
F = 2SE simul. chans., 12 bits, 2MHz
G = 2SE simul. chans., 14 bits, 1MHz
H = 1D chan., 12 bits, 10MHz
J = 8SE simul. chans., 12 bits, 250kHz

"J" Model Input Range

A = 0 to +5V
B = \pm 5V

FIFO Memory Size

1 = 1k A/D samples
2 = 4k A/D samples

Software:

DVME-630EXEC Executive software package in "C" source format. Includes all local functions in downloadable binary format. Uses VT-100 terminal interface on host.

DVME-630SRC

Complete source code to DVME-630EXEC. "C" source code for all host and DSP local functions including boot code, vectors, scheduler, DSP math library, A/D, FIFO/DMA, buffer management and timer/counter function library. Includes UNIX device drivers. Supplied in "C" and TI 320C30 assembly language.

Expansion Memory:

MEM-30 1 Megabyte expansion SRAM (256k x 32). Total installed capacity is 1.5Mb.
MEM-30B 4 Megabyte expansion SRAM (1M x 32). Total installed capacity is 4.5Mb.

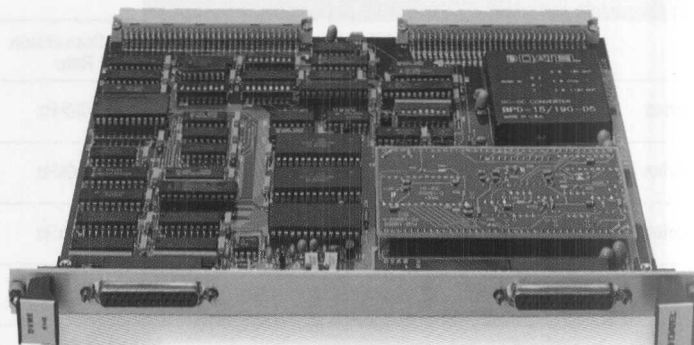
Serial-Port Daughter Modules:

PC-430DAC Two, 12-bit, 100kHz D/A Converters.
PC-430DIG 32 lines, TTL compatible, digital I/O.

DVME-614 Family

High-Speed A/D + FIFO Boards for Streaming Data Applications

- Up to 16 analog input channels
- Up to 10MHz A/D sampling rates
- Choice of 12 or 14-bit A/D resolutions
- 2/4/8-channel simultaneous sampling eliminates phase skew
- Programmable-threshold analog input trigger
- On-board FIFO up to 16k A/D samples for non-stop, gapless, data "streaming" to disk
- 10MHz parallel port avoids bus delays
- Direct streaming to host memory to 64Mb or greater
- Very low harmonic distortion - ideal for DSP/FFT applications
- Excellent array-processor "front end"

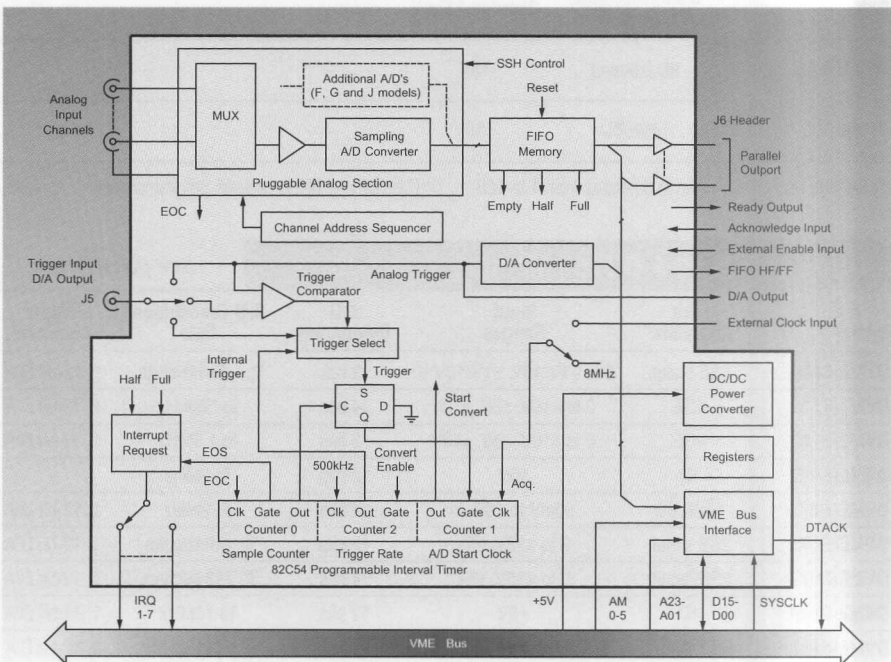


The DVME-614 Family of high-speed analog input boards has been optimized for signal processing applications requiring continuous, non-stop, streaming of data to mass storage with no lost samples. All nine boards in the Family have on-board FIFO memory (up to 16k samples) to decouple the precise timing of the A/D converter section from the high-speed, block oriented transfers of the data bus.

Analog input options range from 1 to 16 channels; A/D converter resolutions can be either 12 or 14 bits; and A/D sampling rates vary from 250kHz to 10MHz. Simultaneous sampling (to eliminate phase skew) is available in 2, 4 and 8-channel configurations. Triggering can be derived from internal clock, external clock or external level. An external trigger can start a single multi-channel scan or "N" multiple scans separated by programmable delays.

A set of low-level device drivers (in assembly and "C") is supplied with each board. They can be adapted to any operating system.

All boards in the Family are optimized for low noise and wide dynamic range. They function well as array-processor "front ends" and excel in all DSP, FFT and digital-filtering applications.



Ordering Information

DVME-614

Input Channels, A/D Resolution and Speed

A = 4 SE simul. chans., 12 bits, 1.5MHz
B = 4 SE chans., 14 bits, 500kHz
C = 4 SE chans., 12 bits, 1.6MHz
D = 1D chan., 12 bits, 5MHz
E = 16SE/8D chans., 12 bits, 2MHz
F = 2SE simul. chans., 12 bits, 2MHz
G = 2SE simul. chans., 14 bits, 1MHz
H = 1D chan., 12 bits, 10MHz
J = 8SE simul. chans., 12 bits, 250kHz

FIFO Memory Size

1 = 1k A/D samples
2 = 4k A/D samples
3 = 16k A/D Samples
(other sizes on special order)

"J" Model Input Range

A = 0 to +5V
B = \pm 5V

Accessories: DVME-691 Screw terminal signal-conditioning panel, pin-compatible to DVME-614E and DVME-614J.

Software: A set of low-level device drivers written in assembly and "C" is provided with each board.

Analog Boards for VME Bus and Multibus I

All DATEL VME boards are manufactured by DATEL, under strict quality controls, in the U.S.A. All boards are power-cycle burned in and calibrated before final production test and are fully warranted for one year.

VME Data Acquisition

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
DVME-611 Series	32SE/16D	40mV to 10V ①	12/14/16 bits	To 400kHz	--	--	Expandable to 256SE/128D channels, 80dB CMRR, 2 TTL digital outputs, on-board interrupt vector registers
DVME-612 Series	32SE/16D	40mV to 10V ①	12/14/16 bits	To 400kHz	2, 12-bit D/A's	--	
DVME-601 Series	16SE/8D	50mV to 10V ②	12/14/16 bits	To 300kHz	--	128kb	68010 CPU, "no programming" executive library PROM, 160 channel expansion
DVME-613 Series	16SE/8D isolated	50mV to 10V ③	12/14/16 bits	To 40kHz	--	--	500V isolation, digital I/O (8 in, 8 out), vectored interrupt, A/D clock
DVME-641	32SE/16D	50mV to 10V	--	--	--	--	Slave A/D channel expander for 611/612/601, cascable
DVME-643T	8 thermocouples isolated	25mV to 100mV	--	--	--	--	Slave A/D channel expander for 611/612/601, CJC, 750V isolation
DVME-643H	8D isolated	±5V	--	--	--	--	Slave A/D channel expander for 611/612/601, 750V isolation
DVME-645	16SE/8D	±10V	--	--	--	--	Slave A/D channel expander for 611/612/601, 16 simultaneous S/H

① Software-selectable gain in 8 ranges from 1 to 128. ② Gain of 1 to 100 is resistor-programmable. ③ Gain of 1, 10 or 100 is jumper-selectable.

VME High-Speed A/D Plus Memory

See page 5-5.

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
DVME-614A	4SE simul.	0 to +1V/10V, ±1V/10V ①	12 bits	To 1.5MHz/chan.	1, 12-bit D/A	To 16ks FIFO	All models of the DVME-614 have a programmable trigger/counter and a 10MHz parallel port. All but the "D" model have an on-board, 12-bit D/A (200kHz update rate) and a programmable-threshold analog trigger.
DVME-614B	4SE	0 to +10V, ±5V, ±10V	14 bits	To 500kHz	1, 12-bit D/A	To 16ks FIFO	
DVME-614C	4SE	0 to +10V, ±5V, ±10V	12 bits	To 1.6MHz	1, 12-bit D/A	To 16ks FIFO	
DVME-614D	1D	±5V	12 bits	To 5MHz	--	To 16ks FIFO	
DVME-614E	16SE/8D	50mV to 10V ②	12 bits	To 2MHz	1, 12-bit D/A	To 16ks FIFO	
DVME-614F	2SE simul.	0 to +10V, ±5V	12 bits	To 2MHz/chan.	1, 12-bit D/A	To 16ks FIFO	
DVME-614G	2SE simul.	0 to +10V, ±5V	14 bits	To 1MHz/chan.	1, 12-bit D/A	To 16ks FIFO	
DVME-614H	1D	±5V	12 bits	To 10MHz	1, 12-bit D/A	To 16ks FIFO	
DVME-614J	8SE simul.	0 to +5V, ±5V	12 bits	To 250kHz/chan.	1, 12-bit D/A	To 16ks FIFO	

① Gains of 1 or 10 are user-selectable on 2 channels. ② Gain of 1 to 100 is resistor-programmable.

VME Software

Model	Host Board	Format	Description
DVME-622SRC	DVME-622	MS-DOS ASCII source disk	Highly portable "C" and 680X0 assembly language comprehensive data playback system for UNIX. Rich function library.
	DVME-601, DVME-614, DVME-613	MS-DOS ASCII source disk	Highly portable "C" and 680X0 assembly language program examples. Included with board or FREE on request. OS-9/UNIX device drivers.
DVME-630EXEC	DVME-630	MS-DOS ASCII source disk	High-speed data recorder for UNIX hosts. Highly portable "C" and 680X0 assembly language with rich DSP library. Host side is source format. DVME-630 side is downloadable binary.
DVME-630SRC	DVME-630	MS-DOS ASCII source disk	Same as above except full source code.

Make DATEL your VME Data Acquisition source

VME Fast A/D-DSP Coprocessor

See page 5-4.

Model	Input Channels	Input Ranges	A/D Resolution	A/D Conversion Rate	Output Channels	Data Memory	Notes
DVME-630A	4SE simul.	0 to +1V/10V, ±1V/10V ①	12 bits	To 1.5MHz/chan.	--	To 4ks FIFO	All models of the DVME-630 incorporate a 32MHz (40MHz optional) TI320C30 DSP CPU operating on a local 32-bit data bus. All have installed ½Mb dual-port SRAM expandable to 4.5Mb with MEM-30. All have an on-board, programmable timer/counter and offer multiple triggering schemes.
DVME-630B	4SE	0 to +10V, ±5V, ±10V	14 bits	To 500kHz	--	To 4ks FIFO	
DVME-630C	4SE	0 to +10V, ±5V, ±10V	12 bits	To 1.6MHz	--	To 4ks FIFO	
DVME-630D	1D	±5V	12 bits	To 5MHz	--	To 4ks FIFO	
DVME-630E	16SE/8D	50mV to 10V ②	12 bits	To 2MHz	--	To 4ks FIFO	
DVME-630F	2SE simul.	0 to +10V, ±5V	12 bits	To 2MHz/chan.	--	To 4ks FIFO	
DVME-630G	2SE simul.	0 to +10V, ±5V	14 bits	To 1MHz/chan.	--	To 4ks FIFO	
DVME-630H	1D	±5V	12 bits	To 10MHz	--	To 4ks FIFO	
DVME-630J	8SE simul.	0 to +5V, ±5V	12 bits	To 250kHz/chan.	--	To 4ks FIFO	
PC-430DAC	--	0 to +5V/10V, ±5V/ 10V ③	--	100kHz ④	2, 12-bit D/A	--	DVME-630 serial-port daughter modules, dual DAC or digital I/O
PC-430DIG	16 TTL	Digital I/O	--	To 500kHz	16 TTL	--	
MEM-30/30B	1Mb or 4Mb SRAM memory expander module for DVME-630						

① Gains of 1 or 10 are user-selectable on 2 channels. ② Gain of 1 to 100 is resistor-programmable. ③ Output voltage ranges. ④ D/A update rate.

VME Analog Output and Special Functions

Model	Output Channels	Output Ranges	D/A Resolution	D/A Conversion Rate	Notes
DVME-628V	8 D/A	0 to +5V, +10V, $\pm 2.5V$, $\pm 5V$, $\pm 10V$	12 bits	167kHz	A16:D16 slave
DVME-628C	8 D/A current loops	Same as above plus 4-20mA	12 bits	167kHz	A16:D16 slave, passive current loops, 15-36V external excitation
DVME-626V	6 D/A	0 to +10V, $\pm 5V$, $\pm 10V$	16 bits	67kHz	A16:D16 slave, $\pm 0.005\%$ linearity
DVME-621	4 D/A isolated	0 to +11V, $\pm 11V$, 0 to +160mA, $\pm 160mA$	12 bits	91kHz	A24:D16 slave, active loop mode, 500V rms isolation
DVME-622	8 or 16 D/A	0 to +5V, +10V, $\pm 2.5V$, $\pm 5V$, $\pm 10V$	12 bits	330kHz	A24:D16 slave, simultaneous update, trigger/timer interrupt
DVME-660	48-line digital I/O	TTL logic	--	To 4 Mword/sec	A16:D16 slave, 24-stage timer/interrupt, programmable direction by byte
DVME-691	Rack-mount signal conditioning screw terminator with flat cables for all DATEL VME boards				

Still Available - Multibus I Analog Boards

Model	Input/Output Channels	Input/Output Ranges	A/D or D/A Resolution	Conversion Rate	Notes
ST-711	32SE/16D A/D	50mV to 10V	12 bits	23kHz	16/20/24-bit Multibus host, programmable pacer clock
ST-732	32SE/16D A/D, 2 D/A	50mV to 10V	12 bits	23kHz	16/20/24-bit Multibus host, programmable pacer clock
ST-703	4 D/A isolated	0 to +5V, +10V	12 bits	167kHz	Channel-to-channel isolated 300V, 8/16-bit transfer
ST-716	4 or 8 D/A	0 to +10V, $\pm 5V$, $\pm 10V$	16 bits	38kHz	16/20/24-bit Multibus host, 0.005% linearity
ST-728	4 or 8 D/A	0 to +10V, $\pm 5V$, $\pm 10V$, 4-20mA	12 bits	200kHz	16/20/24-bit Multibus host, passive current loops, 15-36V external excitation
ST-519	72-line digital I/O	TTL logic	--	To 4Mb/sec	16/20/24-bit addressing, programmable direction by byte, interrupt control

Contact your local DATEL sales office for data sheets on products listed in this catalog.

DATEL Literature

Individual Detailed Data Sheets

DATEL publishes a comprehensive data sheet for each of our products. Each data sheet includes detailed electrical performance specifications, applications information, mechanical dimensions, ordering information, etc. Please contact us for the data sheets you require.

Product Line Reference Catalogs

DATEL publishes a complete Product Line Catalog, which is essentially a compilation of data sheets plus additional technical information, for each of our major product lines:

Volume 1: Data Acquisition and Conversion Components

Volume 2: Analog I/O Boards for EISA, PC/AT and VME Buses

Volume 3: Digital Panel Meters and Instruments

Volume 4: DC/DC Converters

Contact us and you will immediately be sent the current edition of the volume(s) of your choice and be added to our mail list so you will receive new editions as soon as they are printed.

Application Notes

DATEL publishes a set of 8 application notes for data acquisition applications. We are currently preparing a similar set for DC/DC converter applications. Contact us if you would like to receive any or all of the ap notes listed below.

AN-1 High-Speed A/D Converter Designs: Layout and Interfacing Pitfalls

AN-2 Picking the Right S/H Amp for Various Data Acquisition Needs

AN-3 Data Converters: Getting to Know Dynamic Specs

AN-4 Understanding Data Converters' Frequency Domain Specifications

AN-5 Subranging ADC's, Architectures, Specifications & Testing

AN-6 Seeing is Believing: A/D Converters Make the Difference in Imaging Applications

AN-7 Modifying Start Convert Pulses Using Commercially Available Devices

AN-8 Heat Sinks for DIP Data Converters

General Disclaimer

DATEL reserves the right to make changes to our products and/or their specifications at any time without prior notice to anyone. Prices are also subject to change without notice.

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No patent rights or licenses to any of the circuits or DATEL intellectual property described herein are implied or granted to any third party. Furthermore, despite our efforts to ensure otherwise, we can make no representations of any kind that the circuitry and/or information described herein is free of infringement of any intellectual property right or any other right of third parties.

DATEL, Inc. products should not be used in life-support systems, nuclear-facility applications, aircraft-control applications or any similar application in which failure of the product, in any way, could reasonably result in harm to life, property or the environment.

Placing an Order

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When ordering a DATEL product, use the complete model number (including any part-number suffixes indicating product options) as well as a description of the product and its options. You may enter orders by telephone, FAX or letter directly with Company Headquarters (Mansfield, MA, U.S.A.) or with any authorized DATEL field sales representative. Minimum order value and minimum per shipment amount are both \$100.

Outside the U.S.A. and Canada

Place overseas orders directly with a DATEL Sales Subsidiary Office (in Germany, France, the United Kingdom or Japan) or with an authorized DATEL sales representative. International orders received directly at DATEL Headquarters in the U.S.A. will be treated as if placed through the appropriate overseas sales representative. In countries without a local DATEL sales representative, orders should be placed directly with Company Headquarters and confirmed by air mail.

Field Sales Representatives

DATEL has direct sales offices in the United States (Mansfield, MA), Germany (Munich), France (Montigny Le Bretonneux), England (Basingstoke) and Japan (Tokyo and Osaka). We employ an extensive network of field sales representatives throughout the U.S.A., Canada, Europe, the Far East and other areas of the world. Only these sales representatives are authorized by DATEL to solicit sales, and any information or data received from sources other than DATEL or its authorized representatives is not considered binding.

Prices

All prices are F.O.B. Mansfield, MA, U.S.A. in U.S. dollars. Applicable federal, state and local taxes are extra and paid by the buyer. Prices are subject to change without notice.

Quotations

Price and delivery quotations made by DATEL or any of its authorized representatives are valid for 30 days unless otherwise stated.

Discounts

Quantity discounts are available when appropriate quantities of products are ordered in a single order. OEM discounts are available on an order or contract basis. Consult Company Headquarters or your local representative for quotations or additional details.

Terms

Net 30 days.

Acknowledgements and Delivery

DATEL acknowledges all orders, including delivery and billing information, upon receipt. We ship all products in rugged commercial containers suitable for ensuring delivery under normal shipping conditions. Unless shipping specifications accompany an order, we will use the best available method. Shipping charges are normally prepaid by DATEL and billed to the customer except for air freight shipments which are sent collect. When appropriate, product data sheets and/or instructions are included with each shipment.

Order Cancellation

All orders placed with DATEL are binding and subject to cancellation charges if cancelled either before or after the scheduled shipping date. Refer to DATEL's standard Terms and Conditions for specific charges.

Warranty

DATEL warrants that all of its products are free from defects in material or workmanship under normal use and service for a period of one year from date of shipment. DATEL's obligations under this warranty are limited to replacing or repairing, at our option, at our factory or facility, any of the products which shall within the applicable period after shipment be returned to us, transportation charges prepaid, and which are, after examination, disclosed to the satisfaction of DATEL to be thus defective. The warranty does not apply to any products or equipment which have been repaired or altered, except by DATEL, or which have been subjected to misuse, negligence or accident. Under no circumstances shall DATEL's liability exceed the original purchase price. The aforementioned provisions do not extend the original warranty period of any product which has either been repaired or replaced by DATEL.

Returns

Before returning any products, for any reason, you must receive a return material authorization (RMA) number and shipping instructions from DATEL. Items should not be returned via air freight collect as they can not be accepted. If you do not return materials as directed above, considerable delay will be added to processing the return.

Returns Outside the U.S.A. and Canada

Contact either DATEL Headquarters, a DATEL Sales Subsidiary Office or your local DATEL sales representative for authorization and shipping instructions before returning any materials.

Certificates of Compliance

DATEL will supply a standard Certificate of Compliance when requested to do so by a customer. Requests must be specified on the original purchase order.

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